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ORIGINAL LECTURES.

RECENT ADVANCES IN THE SURGERY OF THE BRAIN AND ITS COVERINGS.¹

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MR. PRESIDENT AND FELLOWS OF THE ACADEMY OF SURGERY: In casting about in my mind for a topic worthy of the consideration of this learned body, it occurred to me that an inquiry into the recent advances made in the surgery of the brain and its coverings, might prove both interesting and profitable.

I have endeavored, by repeated eliminations, to prepare a condensed account of all the essential advances made since I completed my monograph upon "Injuries of the Head," which in the delivery shall not exceed the time allotted me by custom; this will necessitate the omission of many interesting details. While repudiating all intention to dogmatise, I shall endeavor to formulate *provisionally* some general rules for our guidance in practice, and on the witness-stand. Some of the alleged advances will, upon examination, resolve themselves into mere confirmations of much older tentative propositions. Statistics will not be introduced, except when necessary to prove the truth of assertions apparently opposed to previous experience, nor will details and histories of cases be interpolated, except when needful to illustrate a principle or elucidate some obscure point.

It has recently been shown² that, while of unusual occurrence, the smallest scalp-wound, if it become infected, may by progression of the septic inflammation lead to periostitis, purulent otitis, osteophlebitis, encephalitis; or, again, from the periosteum the infective process may, by continuity of tissue, through osteophlebitis, initiate thrombosis of the cerebral sinuses with consequent pyæmia.³ Suppose a recent head injury just brought into the hospital, how should we proceed? Do not carelessly pass the forefinger through the filthy, blood-matted hair, and explore at once the depths of the wound, to ascertain its nature, as is too commonly the rule, but carefully shave the scalp, scrub it with nail-brush, soap and water, remove all fatty matter with ether, or a mixture of turpentine and alcohol, completing the disinfection by a thorough irrigation with mercuric bichloride solution. Only now should the wound be examined, when, if either bone or periosteum be found injured, such incisions are indicated as will give free access to the deeper parts, which must next be cleansed. All small,

loose fragments of the external table are to be removed; if large, after disinfection, they should be perforated and sutured in place with catgut, leaving sufficient space between the fragments for drainage; all sharp edges should be smoothed off, and, if deemed necessary, catgut drains can be placed between the osseous fragments. Should there be simply a *clean* fissure, let it alone; but if a *soiled* one, cut it out with a chisel and thoroughly disinfect.⁴

By the light thrown by experiment, and confirmed by recent experience, we must entirely revise our conclusions as to the dangers of trephining, *per se*, or of converting a simple fracture into a compound one. Roberts's propositions would now meet with general acceptance.⁵ Certainly, our increased knowledge as to the risks of the late cerebral mischief, too often entailed by the erroneous opinion that trephining is only indicated when symptoms of *compression* are present, serves to teach more strongly that which I, in common with Gross, Briggs, Gunn, Roberts, and others, have insisted upon, viz., preventive trephining. Wagner has recently presented a more cogent reason for immediate interference in these words: "The entrance of foreign bodies and injuries from unclean objects, therefore, indicate the use of the trephine," because "it is of far greater importance to prevent the infection of the intracranial tissues, than to relieve the brain from pressure;"⁶ even a hair caught in a fissure will certainly produce infection if not promptly removed, as has been proved in more than one instance.⁴ The value of what may appear to some, unnecessary precautions, is proved, when we reflect that when immediately put in practice the mortality was only 1.23; whereas, when twenty-four hours or more had elapsed before treatment was instituted, the death-rate was 33.33 per cent.⁵

Special precautions must be observed when both walls of the frontal sinus are broken. Most thorough disinfection of the sinus should precede perforation of its posterior wall, and at the conclusion of the operation, the cavity must be carefully tamponed with iodoform gauze, remembering that symptoms of secondary compression may result from swelling of the tampon, by imbibition of wound fluids. The orbital margin should be unhesitatingly resected, if necessary to remove infected materials or foreign bodies.

I would, therefore, lay down the proposition: that in the present state of science, the surgeon who neglects to resort to the foregoing precautions is derelict in his duty.

A triumphant demonstration of the value of attention to details is given by Wagner, all of whose cases of fractured base who survived the first twenty-four to forty-eight hours—23 in number—recovered. Similar results can only be attained by attention to the following precautions, in addition to those already mentioned:

¹ Annual Oration, delivered before the Philadelphia Academy of Surgery, January 3, 1888.

² W. Wagner: Königshütte, Volkmann's Sammlung klinische Vorträge, Nos. 271, 272, Chirurg., Nos. 85, April 20, 1886.

³ Horsley's case, Med. Press and Circular, 1886, N. S., 495.

⁴ Hippocratic experience revived, since this was advised by the Father of Medicine, although upon a different theory.

⁵ August and September numbers, Annals of Surgery, 1885.

⁶ W. Wagner, op. cit.

⁴ Wagner, op. cit.

⁵ Wagner, op. cit.

The external auditory canal of the ear traversed by the line of fracture, must be most cautiously and effectively disinfected, filled with iodoform, and plugged with antiseptic gauze. If the ethmoid be fractured, iodoform should be dusted or insufflated into the upper part of the nasal cavities. Extensive fractures with alarming nervous symptoms, due to extravasation of blood or inflammatory exudates, do not contraindicate operation in fractures of the vault, or accessible portions of the base; since, if such cases are recoverable at all, this desired end is more likely to be attained by the effective drainage and asepsis secured by operative interference.

Bearing in mind the immediate risks of encephalitis and the future ones of epilepsy and insanity there can be but one opinion as to the advisability of trephining for all varieties of accessible cranial fractures, provided it can be shown that the operation, *per se*, is not a dangerous one. Undoubtedly, under the old regime, the mortality of the operation was 10.69; but is this true with an improved technique? Certainly not; for after eliminating from Amidon's tables certain cases where no trephining was done, many which were not treated strictly aseptically, verifying the remainder and adding others, Seydel¹ has tabulated 61 cases of operations for epilepsy, neoplasms, etc., which would indicate that strict aseptic methods reduce the mortality of trephining, *per se*, to 1.60 per cent., although it must not be overlooked that injuries to the brain, its membranes or vessels, by careless operating, will increase this death-rate.

If the mortality be so low for operations where no recent injury exists, how much more imperative should it now be to trephine immediately in recent compound and even simple, markedly depressed vault fractures, except in young children.

Are there any new principles deducible from recent experience which should govern the technique of trephining?

At once the question of drainage confronts us: Shall it be capillary or by tube? Upon a nice discrimination of cases will, I believe, depend success in practice.

For trephining in fractures, epilepsy, or insanity, in which no lesion of the dura mater exists, catgut, and catgut only seems indicated.

Where large portions of bone have been removed and replaced in toto, no other method of drainage is possible.

With lesions of the dura mater which are reparable by suture,² the same kind of drain is indicated, except when a brain tumor has been removed.

Wounds of the dura mater which cannot be sutured indicate tube-drainage, or, better, Horsely's method.

Trephining done for intracranial abscess calls for the use of the tube very gradually shortened, with the strictest watching of the case for some weeks after final withdrawal.

If the first perforation made does not effectually drain a blood or pus cavity within the membranes or brain, when the patient is in the *recumbent position*, either a second opening at the most dependent point should be made and through-drainage instituted, or, better still in many cases, the first button of bone should be replaced

after removing a small segment of its periphery, while the second opening is utilized for the drain.

What shall be done with the bone fragments which have been removed? If they are contaminated with foreign material this should be carefully removed even to paring with the bone chisel,³ when the fragments must be placed in a warm antiseptic solution until needed. If the surgeon fears to reimplant them in bulk, the fragments can be carefully minced up with the chisel and dusted over the membranes.

I would call attention to the peculiar value of this expedient as a preventive of the formation of a hernia cerebri, where such injuries to the dura mater exist as to forbid suturing, or where this membrane seems likely secondarily to give way. The experience of Macewen, Weir, and others incontestably proves not only the feasibility but the advantages of a resort to this procedure.

The general principles governing the treatment of compound skull-fractures are strictly applicable to gunshot wounds, so far as the bone lesions are concerned. Wharton's tables so conclusively show the ultimate evils of the retention of a foreign body in the brain, that if the operation can be done without fatal injury to the encephalon, balls should always be removed, since, even primarily, such injuries are certain to be followed by suppurative inflammation, which too commonly is of the diffused form, when death is inevitable.

The most superficial glance at the histories of recoveries after apparently hopeless brain injuries, shows that the result was due to free drainage, as in the famous tamping-iron case, and one of extensive shotgun disorganization of the anterior fourth of the left hemisphere, which I reported to this Society some two years ago.

The principle of free drainage then, rather than the mere removal of the foreign body, is the guiding principle of the modern treatment, although, to effect perfect drainage, both theoretically and practically, the course of the ball must be followed throughout and disinfected, when the missile being accessible, and capable years hence of producing serious trouble, should be removed.

Heretofore, the main difficulty has been a safe method of search for the ball. Flührer⁴ has, however, enunciated a new principle capable of revolutionizing practice, if found reliable, viz., the use of a peculiar probe which is allowed to pass along the track of the ball by its own *gravity*, which is so slight as to be absolutely incapable of penetrating the brain substance. The metal forming the probe is aluminum. This instrument should never be curved if it can be avoided, but when bent, the other extremity should be curved in the opposite direction; this is imperative since it is the only means of indicating what course the instrument is taking.

How, then, should we proceed in a case of ball-wound of the brain? After the usual antiseptic preliminaries and incisions, all loose bone fragments must be removed and the opening enlarged if necessary. The patient's head must be then placed so that the track of the ball is as nearly vertical as possible, when the probe, gently introduced into the brain-opening, is to be allowed to *gravitate* along the ball-track. Flührer⁴ has shown that when

¹ W. Macewen: October and November Nos. Annals of Surgery, 1887.

² New York Med. Journal, March 28, 1885.

³ Hopkins: Polyclinic, vol. v. No. iv., also many other cases on record. I have myself used this method with advantage.

⁴ E. M. Moore has also observed the same. Trans. Amer. Surg. Association, vol. iii. p. 91.

the whole cerebral mass has been traversed without penetration of the opposite wall of the cranium, the ball usually rebounds at an angle equalling that of incidence, and becomes imbedded in the brain, about one inch above, below, outward, or inward, according to the direction of the ball. If the probe shows this complete perforation to have occurred, a large counter-opening is to be made, the ball extracted, and the dressing completed as will be indicated for non-perforating ball-wounds.

Suppose, however, that the ball is imbedded in one hemisphere? Place the head as before, and locate the ball with the gravity-probe, then, if no vital parts intervene, pass the probe onward through the brain-substance till it strikes the skull; trephine at this point, cause the probe to emerge, attach two long threads of aseptic silk to the anterior extremity of the instrument, which must now be withdrawn posteriorly, leaving the threads in the wound. With the probe passed through the wound of entrance, measure the distance of the ball from the surface. Now draw through the wound track by means of one of the silk threads passed with a needle through the end and out by the eye, a No. 3 English catheter with straightened stylet, and turn the head so as to have it as nearly in a horizontal plane as possible. A pair of long, slender, double-toothed, self-closing cervix forceps, notched with a file behind the teeth so as to hold a loop of fine aseptic silk must be passed to the previously measured depth—again verified after passing the guide—alongside the catheter by means of the silk loop: if the loop does not play freely over the guide, let guide and forceps move together. Should the ball not be found on one side of the guide, the forceps must be removed and reintroduced on the opposite side, above or below. When grasped, ball, forceps, and guide must be withdrawn together. By means of the remaining thread left in the ball-track, a drainage tube is carried through the whole course of the wound and an antiseptic dressing applied. Drainage must be effected after the same manner for perforating wounds.

Suppose the ball is not found, thorough drainage is afforded for all inflammatory products, and the chances of recovery are enhanced. In a recent case seen with Dr. Heyl at the Episcopal Hospital, failing to find the ball, I introduced a drainage tube about one inch into the brain-substance which evacuated considerable purulent fluid for one week, when it became displaced: recovery ensued without a single bad symptom, although cerebral mischief had evidently commenced before the operation, some twenty-four hours after injury.

In view of these and numerous other facts, active, but cautious interference, is not only now warranted, but demanded, for gunshot wounds of the head.

What should our attitude be with regard to that too rarely recognized condition, osteophlebitis from contusion or disease? When the "puffy tumor of Pott"¹ exists, the bone should be trephined or otherwise freely removed, the diseased area thoroughly disinfected, and strict asepsis maintained. This course, I contend, is correct, not because pus will always be found between the dura mater and bone—for this often does *not* exist—but because *osteophlebitis* is present which frequently leads to fatal septicæmia or pyæmia. That under the most unfavorable circumstances success is still attainable

in cases of this nature, which have resulted even in thrombosis of the lateral sinus and septic embolism of the heart and lung, is proved by a recent operation of Horsley's, the disease originating, as is usually the case, from old middle-ear disease.¹

When considering what should be done for malignant growths of the skull, two most important questions press for solution. If a patient be primarily attacked with malignant disease of the cranial bones, or the subjacent osseous tissue become secondarily involved by extension from the overlying soft parts, shall any operation be done? If an operation be decided upon, what are the prospects of relief, are they merely temporary or permanent?

If it can be shown that the necessary operative interference in such cases is not specially dangerous to life, the first question is answered in the affirmative.

As a typical instance of the successful removal of a primary growth take that of Gussenbauer,² who, for a sarcoma of the frontal bone, after reflecting one-half of the forehead as a flap, removed with chisel and forceps the frontal bone over an area measuring three by three and one-half inches, detached the growth at one point from the dura mater, and at the end of two years no recurrence was detectable.

Again, Pauly³ reports the following case illustrative of the impunity with which these operations can be done. In March, 1882, he removed a portion of the frontal bone for a fibrous sarcoma. The wound healed, but at the end of two months the growth returned in situ. Cur-retting now failing to benefit, six months later the "frontal bone was removed from the root of the nose to the zygoma and up to the hair line; in one month the wound was quite healed. Five months later an enlarged gland behind the angle of the jaw was suggestive of return."⁴

Still more corroborative of the slight danger attendant upon these operations when conducted on strictly antiseptic principles, is a case of Krönlein's, which certainly teaches that in properly selected cases, malignant growths secondarily affecting the cranial vault, should be dealt with precisely upon the same general principles as govern operative treatment for similar neoplasms situated elsewhere, viz., early removal and with a free hand; if the latter part of this advice be not strictly adhered to, such operations had better not be attempted, for the danger to life is the same with no reasonable prospect of good accruing, if timidity gains the upper hand. Of course, the freedom with which surrounding parts should be removed must depend upon the importance to life or motility of the contiguous portions of the encephalon.

Krönlein, after three excisions and two free cauterizations of a carcinoma of the forehead, by another surgeon—i. e., insufficient operations which were only provocative of return—successfully removed—so far as life was concerned—a cancerous ulcer, two and a half inches wide "extending from the root of the nose beyond the line of the hair." To get well outside of the disease area, he removed a piece of bone and dura mater about three-quarters of an inch in diameter, and in addition nearly

¹ Horsley's case already referred to.

² Zeitschrift f. Heilkunde, Prag, 1884, Bd. v.

³ Verhandlungen der. d. Ges. f. Chirurgie, 1883.

⁴ Op. cit.

¹ Or other evidence of bone inflammation.

half an inch of the falx cerebri. Temporary benefit ensued, but a second operation becoming necessary two months later, the patient succumbed, but not then even until three months after this last operation.¹

Although of no permanent benefit, does not such a result encourage us to demand for similar cases *early complete* operations? Death is inevitable sooner or later, and is it not worth while to run the comparatively small risk inherent to such operations, to achieve occasionally a permanent result?

Of fifteen cases done with full antiseptic precautions thirteen recovered from the operation and two died—one of air embolism, a preventable accident.² The dura mater was incised or portions excised in eight cases; in four operations the falx cerebri was cut; the longitudinal sinus was twice divided; and in as many instances portions of brain substance were removed. In all considerable bone was excised, and in five the gap left measured transversely three inches. These fifteen operations were done upon twelve patients, in all but two the growth occupying the frontal region. Recurrence took place in only one instance before healing and rapid recidives, all told, in four cases.³ Such a showing, I believe, warrants the following statement.

That when malignant, or other tumors clinically dangerous to life, attack the accessible bones forming the brain-case, early and thorough removal is indicated, provided the proper completion of the operation does not necessitate the removal of portions of the encephalon essential to life or, perhaps, to progression.

A much larger measure of success awaits those who now operate for that very fatal complication, intracranial hemorrhage, than formerly obtained. The statement of Hutchinson⁴ is no longer true, that "the modern annals of surgery do not contain any cases in which life has been saved by trephining for this state of things."

Cecherelli,⁵ Krönlein, Weiseman, and others have presented an overwhelming mass of statistical and practical evidence of the advantages of operative interference.⁶

The first question to be settled is, Shall an anæsthetic be given? After Godlee's experience, I for one, think that chloroform is certainly contraindicated, while I also believe that ether is prejudicial and is usually unnecessary from the semi- or completely comatose condition of these cases.

Again, where should the skull be perforated in those cases where neither fracture nor external injury exists.

Since the middle meningeal artery is usually the source of hemorrhage, unless specially contraindicated, the trephine had better be placed⁷ from an inch and a quarter

to an inch and a half behind the external angular process of the frontal bone on a horizontal line drawn around the skull, at the level of the upper margin of the orbit, parallel with "Reid's base line." Should this opening reveal neither clot nor a bleeding vessel, a second opening on the same line just below the parietal boss must be made.¹

In one successful case of Krönlein's these two openings were made and a drainage tube passed through both.

The same surgeon correctly diagnosed the presence of clot in four cases, in two successfully operating and removing it, but failing to make the second opening in the other two, the patients died, post-mortem examination showing that a second perforation would have been successful.

Wetherle⁸ also reports a fatal case owing to failure to make this second opening. After removal of the clot by forceps and antiseptic irrigation, unless all bleeding has ceased, if in the dura mater the vessels must be secured by ligatures passed with a curved needle, by a red-hot knitting needle, or acupressure will suffice;⁹ or, again, especially for the vessels of the pia mater, *serre-fines* left until spontaneously separated may be tried.⁴

I, in common with others, have been compelled to resort to antiseptic tampons. Unless through-drainage is clearly necessary, the first bone-button had better be replaced when two openings have been made, and the more dependent one utilized for drainage. If after trephining severe secondary hemorrhage occurs, Jacobson recommends first the application of a freezing mixture over the dressings, then placing the patient in the upright posture, next compression of the common carotid, and finally, if this fails, ligation of the same vessel.

Weiseman's latest statistics⁵ show that of 147 cases treated by the expectant plan 131 died, or about nine-tenths, while of 110 operated upon, only 36 died, or about one-third. Moreover, it must be borne in mind that in the majority of those who died, the extravasation was not reached, and, of course, not removed; had this been done the mortality would, undoubtedly, have been less.

This is a far better showing than my statistics collated in 1883, and is unquestionably due to the prevalence of antiseptic methods. Indeed, Krönlein maintains that this operation, aseptically performed, is perfectly safe, death resulting simply from complications unconnected with the operation.

The chief advance in the treatment of brain abscess is the making of a second bone opening at the most dependent portion of the cavity, if the first trephine cut is not favorably situated for drainage, after which the first opening can be closed by its own bone-button, notched on one side to prevent accumulation of pus and wound-secrections. Mr. Barker prefers a silver to a rubber tube,

¹ Deutsche Zeitschrift f. Chirurg., Bd. xxi. and xxii., 1885.

² Either by previous ligation of an endangered sinus or keeping the head low and irrigating the wound constantly.

³ Editorial, THE MEDICAL NEWS, Dec. 5, 1885, pp. 629-630.

⁴ Several of these successes had occurred within a few years of the time Hutchinson wrote, and this statement is merely an evidence of careless research.

⁵ La trepanazione del cranio in rapporto alle sue indicazioni, Annali univers. di med. e. Chir., April-June, 1885.

⁶ A high temperature suddenly induced after a head injury, with slow pulse, slow labored respiration, slowly increasing hebetude and hemiplegia, after an interval of consciousness following the traumatism have lately been asserted to be conclusive proof of intracranial hemorrhage from the middle meningeal artery.

⁷ Krönlein: Deutsche Zeitschrift f. Chir., Bd., xxiii., Hefte 3 und 4, 1886.

¹ Where a vertical line carried directly upward behind the mastoid process bisects the horizontal line.

² Northwestern Lancet, Nov. 15, 1885.

³ A pellet of wax, or plugging the canal, when it exists, with a match are other means.

⁴ This was suggested by Fluhrer, op. cit.

⁵ Ueber die Indicationen zur Trepanationen mit besonderer Berücksichtigung, etc., Deutsche Zeitschrift f. Chirurg., Bd. xxi. und xxii., 1885. I would here acknowledge my indebtedness for the facts from these papers to leading articles in THE MEDICAL NEWS of December 26, 1885, and May 8, 1886.

as being both easier of introduction and retention. Fenger and Lee's¹ case teaches how gradually the tube must be shortened, and how long after its final removal it is wise to watch a case. Both upon anatomical and pathological grounds, I think that it is usually best to trephine for intracranial suppuration following chronic ear disease, one and one-fourth inches above, and the same distance behind the centre of the cartilaginous external auditory meatus. Through the perforation thus made the pus must be sought by passing an aspirator needle downward, inward, and slightly forward, toward the petrous bone. When the pus is found, the needle track can be enlarged by a Volkmann's spoon,² and a drainage tube introduced.³ The point mentioned has been selected because pus is more often found in these cases in the temporo-sphenoidal lobe than in the cerebellum or elsewhere, for the tympanic roof is the thinnest portion of the bone, while more vessels pass from the tympanum and along the squamoso-petrous suture to the dura mater than from the posterior portion of the petrous bone. In all cases, however, the foramen for the mastoid vein should be examined, before perforating the bone, because "if there be inflammation on the posterior aspect of the petrous bone, it can hardly reach the cerebellum without forming a layer of pus under the dura mater of the lateral sinus. If this is so the pus will escape by the mastoid foramen if the latter be exposed."⁴ When this condition is found, a spot beneath and slightly posterior to the mastoid foramen, below the inferior curved line of the occipital bone, will be the proper place to explore for cerebellar abscess following chronic middle ear trouble.⁵ I have given Mr. Barker's points for perforation in preference to those of Mr. Caird and others, because they are safer anatomically, since they are less apt to injure the meningeal artery, the pus can be evacuated through a comparatively callous portion of the brain, and nine-tenths of these abscesses in the temporo-sphenoidal lobe occupy a space three-fourths of an inch in diameter, whose centre is one and a half inches above and behind the centre of the cartilaginous external auditory meatus.⁶

In this connection let me give the result of Spitzka's researches as to the use of exploratory aspiration. "Experience with human and experimental pathology teaches that exploratory needles should never be introduced into the internal capsule, the contiguous ganglia or the lateral ventricles, merely for exploratory purposes, unaided by positive clinical evidence of the location of the disease; but no hesitation need be felt in the puncturing of the brain for hydrocephalus."

"Accessible neoplasms of the brain, which have resisted medicinal treatment, and which continue to grow and threaten life, should be removed, for the reason that they are generally single, seldom have secondary deposits, are surrounded by an inflammatory zone of demarcation, and *always* kill by pressure."⁷ These words of Amidon's admirably express the present position of surgery with

regard to brain tumors. But can every case which resists medicinal treatment be confidently turned over to the surgeon with the idea that whether the case recovers or not, at least the tumor can be found, and the operation can be completed.

W. Hale White's¹ analysis of 100 brain tumors examined after death, shows how rarely such operations are feasible. Thus:

Of 45 tubercular tumors, 7 possibly could, and 3 certainly could have been removed.

Of 24 gliomata, perhaps 6, and certainly 4 might have been operated on.

2 glio-sarcoma would have been inoperable.

Of 10 sarcomata, only 1 could have been removed.

Of 5 carcinomata none ought to have been attacked, because of secondary growths or multiplicity of tumors.

5 gummata could all have been reached, but would have been, of course, amenable to medicinal treatment.

Of 4 cysts 1 could have been reached.

Of 3 tumors whose nature was doubtful, 2 would have been fit for the knife.

1 lymphoma from general contamination would have been inoperable; and finally,

1 myxoma would have been accessible.

Closely scrutinized, of this 100 cases only 12 were certainly operable, and 6 more could possibly have been successfully attacked.²

While unable to give statistics of completed operations for brain tumors, when we recall Horsley's remarkable series, Durante's and Keen's successes, is it at all doubtful that the mortality will greatly diminish in the near future? A rapid review of Horsley's methods will show why his success exceeds that of others.

The head must be carefully shaved the day before operation, washed thoroughly with soft soap, followed by ether, the situation of the growth localized and marked on the scalp, the head covered with lint wet with 1 : 20 carbolic lotion, and oil silk with a layer of cotton bandaged over all. A purgative should be exhibited the night previous to, with an enema on, the morning of operation.

About one hour previous to the administration of the anæsthetic a hypodermatic injection of one-quarter of a grain of morphia should be given, and, unless the heart be diseased, chloroform is preferable to ether, since ether produces more cerebral excitement. The object of administering morphia is twofold—*i. e.*, less chloroform is needed, and from Schäfer and Horsley's experiments, this drug contracts the arterioles of the central nervous system,³ thus lessening hemorrhage.

The chief risk being septic encephalitis, the spray may be used solely as a cleanser of the atmosphere.

All incisions of the soft parts should be vertical to the skull, and include all the layers at one stroke, except the periosteum. A single flap should be thus raised, its outline being a shallow curve, in order not to divide collateral vessels, and so planned as to avoid the main scalp arteries. These indications can readily be fulfilled without interference with drainage, since the patient will lie in the supine position.

¹ Transactions American Surg. Association, vol. iii, pp. 65, et. seq.

² If preferred, a pair of dressing forceps can be first carried down along the needle as a guide, and withdrawn, after Hilton's method, but the spoon seems better.

³ Barker: Macewen, Schomdorff, Trunkenbord, Greenfield, report cases; all recovered

⁴ Barker: Brit. Med. Journal, December 11, 1886, p 1155.

⁵ Op. cit. Cerebral abscess is three times as frequent as cerebellar or those in other portions of the encephalon.

⁶ Barker: Brit. Med. Journal, 1887, vol. i. p. 407. ⁷ Op. cit.

¹ Guy's Hospital Reports, vol. xliii., 1886.

² The figures differ from those given by the author, but careful addition of the numbers given in the text sum up as I have given above.

³ When tapping for hydrocephalus I have resorted to this method with apparent benefit.

The periosteum must now be incised, raised, and reflected; if more bone has to be removed than was originally planned the periosteum must be carefully dissected back off each new portion.

Two large trephine cuts—Horsley recommends that the crown of the instrument be of the diameter of two inches—should be made at the two extremes of the bone area to be removed, when the intervening bridge can be partially sawn through with a Heys saw, and the division completed with the bone forceps. Almost as rapid, and a far safer plan—since the bone over brain-tumors is often not thicker than cardboard—is to remove the bone with the rongeur, as modified by W. Barton Hopkins, after one or more preliminary trephine cuts of the ordinary size. In many instances the bone fragments had better be replaced, and accordingly should at once be placed and kept in a warm antiseptic solution.

Next the dura mater must be cut around four-fifths of the osseous orifice, one-eighth of an inch from the bone, so as to leave room for stitching; start the incision with a scalpel, but complete it with blunt-pointed scissors. Any arteries seen lying in the line of the proposed dural incision must be first tied, by passing ligatures through the dura, beneath and around the vessels, with a curved needle before incising the membrane.

The brain being now exposed, note first if it bulges into the wound—*i. e.*, is the intracranial tension increased? Next look for a yellowish tinge or possibly lividity, which will denote a tumor in the corona radiata beneath the cortex. Now closely scrutinize the vessels and perivascular lymphatics, noting especially "any yellowish-white patches in the walls of the latter indicating old mischief." Finally ascertain whether the brain has undergone any alterations in density, although in most subcortical tumors the diagnosis can only be made certain by an exploratory incision.

Hemorrhage has been much dreaded in the removal of brain tumors, but the fear is unfounded, for the arteries and especially the arterioles, which are chiefly concerned in such operations, run perpendicular to the cerebral surface and sponge-pressure soon checks all bleeding. Should this fail, ligature of the larger vessels must be tried, but if their walls are too fragile¹ to stand ligation, forcipressure is alone available. In one case at least, Weir's,² continuous pressure with iodoform-gauze packing failed to prevent fatal secondary, or rather recurrent hemorrhage, and the operator declared that should a similar case occur in his practice he would leave one or more pressure-forceps on the bleeding vessels for from twenty-four to forty-eight hours. Fluhrer³ has shown that the ligature often fails to hold on the vessels of the pia mater, and advises leaving Nunneley's artery-forceps on any bleeding points until the instruments separate of themselves. I recognized the advantage of this practice recently, when assisting Dr. Simes in a case of subdural hemorrhage proceeding from a wounded artery of the pia mater; here a small wire *serre-fine* was substituted for the pressure-forceps, and left *in situ* for days. As the cerebral arteries are terminal, avoid every vessel possible,

this end being often attainable by lifting them out of the sulci between the convolutions, and after removing the subjacent brain, replacing the pia mater. Horsley thinks that if any thrombosis should occur in these vessels it would only be temporary. If one of the large venous sinuses be wounded during an operation, its ligation is a perfectly safe procedure, healing occurring as in veins, and collateral vessels enlarging alongside of the occluded channel. Sponge-implantation or antiseptic tampons will always temporarily and often permanently¹ arrest the bleeding from a wounded sinus. The risk of air embolism is not imaginary, but can be obviated by keeping the head low and the wound well irrigated. When it is evident that a sinus must be wounded in a proposed operation it had better be primarily ligated as in a case of Küster's.²

Incisions into the brain must always be clean-cut, be vertical to the surface, and directed into the corona radiata, when necessary, so as to avoid damage to the fibres coming from other portions of the cortex, or those surrounding the seat of operation. The paths pursued by the fibres from the cortex must be kept constantly in mind when incising the brain, and where possible portions of each centre involved should be left, as under such circumstances the coarser movements of the part governed will often be retained.³ Finally, it is absolutely essential to be thoroughly familiar with the encephalic blood supply to decide where to make the incisions, in order to have a full understanding as to what portions of the remainder of the organs certainly will be deprived of their blood supply, and what portions may possibly be rendered avascular.

When a portion of brain is excised, the underlying cerebral tissue soon bulges up almost to a level with the cortex while the cut edges evert, and if "less brain than bone is removed," protrusion—*i. e.*, an acute hernia cerebri forms. A persistence of this dangerous condition is prevented by the weight and primary union of the scalp-flap; the advantages afforded by the large one recommended are thus apparent.

After all oozing has been arrested by gentle sponge-pressure or ligatures, in my judgment the flap of dura mater, if the operative procedures have left it intact, should now be carefully sutured with chromic catgut to the margins of the membranous opening, leaving space for the easy passage of a drainage tube at the most dependent point. The scalp-flap should then be laid down and secured by stitches of medium silk placed one centimetre (about one-third of an inch) apart with horsehair sutures between.

When brain substance has been removed drainage should not be kept up more than twenty-four hours, because firm union must be secured within four or five days, and a certain degree of pressure should in the meantime be exercised upon the brain which tends to protrude, in order to avoid hernia of the organ. Again, there should be some protective between the brain and scalp in the form of soft—*i. e.*, non-inflammatory—con-

¹ Dr. W. W. Keen informs me he met with this difficulty, and succeeded by drawing the catgut only tight enough nearly to close the lumen of the vessels.

² Birdsall and Weir: *Annals of Surgery*, August, 1887, p. 149.

³ Op. cit.

¹ Author's article, *International Encyclopædia of Surgery*, on "Head Injuries;" also Hopkins, *Annals of Surgery*, July, 1885, p. 65.

² See Senn on "Air-embolism," or Berliner klin. Wochenschrift, p. 673, 1881.

³ See H. Jackson in discussion on Horsley's paper "Brain Surgery," *British Med. Journal*, 1886, vol. ii. pp. 670-675.

nective tissue. Briefly, all these desirable results are obtained by:

1. Placing a tube at the most dependent portion of the wound when the patient lies supine, for twenty-four hours only, to drain all blood and serum.

2. After twenty-four hours remove the tube and re-dress as at first antiseptically, making "firm but gentle pressure over the centre of the flap."

3. If on the third day pain and throbbing in the wound be complained of, and the flap, on exposing the wound, be found "distended in the centre the periphery being firmly united," undue collection of wound-fluids has taken place. If it appears probable that the pressure will break down the union of the flap, the track of the drainage tube must be gently opened up with a probe, and some of the pent up fluid let out; if the union seems safe to hold, let the accumulation alone, since after the evacuation of the fluid the advantages of supporting pressure are lost. The tension at most usually requires to be relieved but once. This liquid cushion, until absorbed, represses the tendency to hernia, promotes absorption by the meningeal lymphatics of all inflammatory exudates, thus favoring rapid union, and serves as a scaffolding for the formation of normal connective tissue which is formed within a few days, at least in the lower animals.

After from five to seven days boric acid, cotton, and collodion for support are better than the ordinary antiseptic dressing. The stitches can be removed any time after the first week.

Should a second operation become necessary, or a primary one for brain injuries which have resulted in scars of the cortex, especially those produced by traumatic losses of brain-substance, which have healed after free suppuration, great caution must be exercised, since the cicatrices often displace large vessels, and are traversed by veins of considerable size.

Encouraged by Horsley's success in excising brain-scars for epilepsy, Hughlings Jackson¹ has suggested the propriety of removing the seat of "the discharging lesion," in cases of the spontaneous variety, when the spasms begin "very locally, deliberately, and when the fits are often repeated."

The theoretical advantages of this suggestion have been essentially proved by the following case of Macewen's, which certainly seemed cured by the removal of the site of the discharging lesion,² as well as by one of Jackson's, operated on by Horsley.

A young man in perfect health, having received two years previously a skull injury, which in six weeks resulted in headache and epilepsy, came under Macewen's care, suffering from one hundred or more attacks per diem; in which, however, he never entirely lost consciousness. The muscular spasms were limited to the side opposite that of injury, at which point a slight depression was detected. Trephining here at once uncovered the brain, revealing an old rupture of the membranes. A small circumscribed area of non-suppurative inflammatory softening existed beneath the bone-opening. Although apparently thoroughly anesthetized, the removal of the diseased tissue with a sharp spoon at once produced a violent convulsion. All pain and convulsions ceased after the operation.

In traumatic epilepsy, then, in addition to the removal of all depressed bone, cicatrices of the brain and membranes must be freely excised, including, if possible, the site of the discharging lesion.

Cysts should, after the same precautions as advised for cerebral tumors, be carefully curetted and drained, preferably by the tube, but recognizing the risk of hernia cerebri by this method of treatment.

For the successful therapeutics of hernia cerebri, it is requisite to place absolute confidence in the indications for treatment so plainly discernible after a careful study of the pathology of this affection. There are two principal and one subsidiary factors in the production of hernia cerebri. As has been said, the normal intracranial tension after incision of the membranes and removal of a portion of brain, suffices to cause cerebral protrusion, if less brain tissue than bone is removed. Hence, the removal of the support of the membranes and bone, plus increased tension are the chief causes, and, in consequence, anything favoring these conditions is to be avoided. What can increase intracranial tension? Manifestly only encephalitis, which is also productive of the subsidiary, but effective factor, softening of the cerebral tissues. How can we best prevent intracranial inflammation? By strict asepsis. But is this all that is essential? No; for the normal intracranial tension, as we have just seen, is almost efficient by itself, so that suturing of the damaged membranes must be done when possible. Where the suturing either cannot be done, or seems likely to fail, Horsley's modified drainage, to keep up due restraining pressure should be tried. Finally, I would make a tentative suggestion, grounded upon the treatment of a somewhat similar condition of the membranes of the spinal cord, viz., the suturing to the margins of the membranous defect, a thin slice of aseptic sponge; in other words, a sponge graft, which may serve, after infiltration with and organization of the contained white cells, as an effectual barrier against brain protrusion. Moreover, whenever possible, replacement of the bone fragments, either in toto, or after Macewen's plan, will in many cases afford the requisite amount of restraining pressure.

I would here call your attention to the steadily lessening mortality attendant upon the strict aseptic treatment, aided by gentle pressure, of hernia cerebri, and the avoidance of anything which will weaken the support of the layer of granulations, which forms, or tends to form, over the exterior of all brain protrusions, which is the sole barrier against further extrusion of the cranial contents, and which by its organization into contracting scar-tissue finally reduces the hernia.

The experience of the last four years has proven the truth of what I advanced years ago, that ligating, excising, and cauterizing these protrusions, while at times ending in recovery, is unscientific, because opposed to the indications derived from the pathology of the affection; and that such practices are attended by a rate of mortality far higher than that just advocated. The danger does not reside in the mere protrusion of brain-substance, but in the *encephalitis* which is the cause of the hernia, or is consequent upon it.

In conclusion, let me venture the prophecy, that those of my hearers who now consider much of what I have advanced to-night as far too heroic, will live to look upon my suggestions as mere matters of course, and as little to be reprobated as ovariectomy.

¹ British Medical Journal, October 9, 1886.

² Senn's Four Months among the Surgeons of Europe, p. 17.

ORIGINAL ARTICLES.

EXPERIMENTAL STUDIES ON THE CAUSATION OF TYPHOID FEVER, WITH SPECIAL REFERENCE TO THE OUTBREAK AT IRON MOUNTAIN, MICH.¹

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AND

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LAST October, having heard of the prevalence of a severe epidemic of typhoid fever at Iron Mountain, Michigan, we requested Dr. G. B. Johnson, a physician of that place, to forward to us a sample of the drinking water used by families in which the disease had appeared. This request was immediately complied with, and we determined to make the most thorough tests possible. The ordinary sanitary analysis, which consists in the determination of free and albuminoid ammonia, chlorine, nitrates, and nitrites, we determined would be altogether inadequate. Besides, as we afterward learned, such an analysis had already been made by the competent chemists of the Chapin mine at Iron Mountain. The results of this analysis, together with those of other waters in the village, made by the same chemists, will be given further on.

After much deliberation, we determined to inoculate sterilized meat preparations and sterilized milk with the suspected water, and then to keep the material at or near the temperature of the human body for varying periods of time, and to ascertain whether or not there would be any poisons developed by the bacteria which were suspected of being in the water. The following are the details of the method:

A number of Erlenmeyer flasks of 400 c. c. capacity were thoroughly cleansed and rinsed with distilled water, then dried in an air-bath. When dry, they were tightly closed with plugs of cotton, and heated for two hours at 140°-150° C.

A litre of fresh milk was placed in a large flask, plugged with cotton, and heated in a Koch's steam sterilizing apparatus for over three hours. The flask was then taken out, and, while yet warm, its contents were transferred by means of a sterilized graduate and sterilized funnel, in portions of 130 c. c. each, to the above-mentioned sterilized, small flasks. The transfer was made as speedily as possible, and the flasks were immediately plugged with cotton, and capped with pieces of filter-paper, which were held in position by means of rubber bands. The flasks, thus prepared, were placed in the steam sterilizing apparatus, and heated for two hours. This was found to produce perfect sterilization.

One pound of lean beef was chopped up finely and treated with one litre of distilled water. The

whole was set aside in a cool place for twenty-four hours, being occasionally well shaken. It was then filtered through cloth, the filtrate was diluted to one litre with distilled water, placed in a large beaker and heated almost to boiling. Then twenty-one grammes of peptone, and five grammes of pure sodium chloride were added. While still hot, the solution was carefully neutralized with sodium carbonate, then placed in the steam sterilizer and heated for two and one-half hours. After removal, and when cold, it was filtered through paper; the filtrate was made up to one litre with distilled water, placed in a large assay flask, plugged with cotton, and heated in the steam sterilizer for three hours. After cooling it was transferred to the sterilized flasks, which were plugged with cotton and heated for two hours in the steam sterilizer.

Nov. 9, 3 P. M. Some of these flasks were inoculated with Iron Mountain water; others with some water which we had received from Lansing, Mich., and which had been used by a family, some members of which suffered from typhoid fever; and one each of the milk and meat preparations was left without inoculation, and used as controls.

Two of the meat and two of the milk flasks were inoculated with 30 c. c., each, of the Iron Mountain water, and one meat and one milk flask with 50 c. c., each, of the same water. The same number of flasks, and the same amount of water were used with the Lansing water. Thus we had six flasks inoculated with the Iron Mountain water, six with the Lansing water, and two controls.

These flasks were then placed in a Koch's vegetation apparatus and kept at from 30°-38° C.

11th. Forty-seven and a half hours after the inoculations were made, four flasks, one containing meat preparation and Iron Mountain water; the second, milk and Iron Mountain water; the third, meat preparation and Lansing water; and the fourth, milk and Lansing water, were removed from the vegetation trough, and examined.

The meat preparation inoculated with Iron Mountain water had a strong, repulsive odor, showed an abundant, white bacterial growth, and was neutral in reaction. It was filtered, rendered feebly acid with hydrochloric acid, extracted with ether, then rendered alkaline with sodium carbonate, and extracted successively with ether, benzole, and amyl alcohol.

The acid ether extract was allowed to evaporate spontaneously, the residue was dissolved in alcohol, acidulated with dilute hydrochloric acid and evaporated on the water bath. The reddish residue was dissolved in water, filtered and tested for ptomaines. It gave no alkaloidal reactions, and contained no poison.

The alkaline ether extract, treated in the same manner as the acid extract, gave slight precipitates with phosphomolybdic acid and platinum chloride, but was also inert.

The alkaline benzole extract gave no alkaloidal reaction, and was free from poisonous properties.

The amyl alcohol extract gave slight precipitates, but if it contained any poison the amount was too small to have any effect upon animals.

¹ A Preliminary Report to the State Board of Health of Michigan.

After the above extractions had been made, the fluid was again rendered acid with dilute hydrochloric acid, and then evaporated in vacuo at 40° C. The residue was treated with absolute alcohol, filtered and again evaporated in vacuo, again taken up with absolute alcohol and now allowed to evaporate spontaneously. The final residue dissolved in water gave precipitates with many of the alkaloidal reagents, but showed no poisonous properties.

We were now convinced that no poison had yet developed in the meat preparation inoculated with the Iron Mountain water.

Similar examinations were made with the milk and Iron Mountain water, the meat preparation and Lansing water, and the milk and Lansing water, and similar results, so far at least as the failure to detect any poison is concerned, were reached. Indeed, the chemical reactions were marked by only slight variations. The bacterial growths were much more abundant in the Iron Mountain water inoculations than in the others.

16th, seven days after the inoculations were made, four flasks, similar to those previously examined, were removed from the vegetation apparatus, and their contents were submitted to analyses similar to those already detailed.

The meat preparation inoculated with the Iron Mountain water was strongly alkaline in reaction and gave off a marked amine odor. After being acidified with hydrochloric acid, it was evaporated on the water-bath, the residue was extracted with absolute alcohol and filtered. The filtrate gave a precipitate with an alcoholic solution of mercuric chloride, but the precipitate proved readily soluble in slight excess of the precipitant. The mercury was removed by precipitation with hydrogen sulphide and filtration. The filtrate was evaporated on a water-bath, leaving a syrupy residue with some crystals of sodium chloride. The syrup was poured off from the crystals, taken up with water, and a portion of it (only a few drops of the syrup) was injected by means of a hypodermatic syringe under the skin on the back of a cat. The temperature of the cat before the injection, taken with care and with a tested thermometer in the axilla, was 99.5°. The following is a record of the effect observed in the experiment:

EXPERIMENT I.—Temperature before the injection, 99.5°.

Time of injection, 3:14.

3:24. Temp. 100.2°.

3:44. Temp. 101.5°. The cat drinks a large quantity of water, although she had an abundant supply of milk, which had been within her reach during the day, and of which she had previously partaken. After drinking there is considerable retching, but no vomiting. The respirations are greatly accelerated and jerky. The pupils are dilated, but respond to light.

3:54. Temp. 101.8°.

4:19. Temp. 101.8°.

4:30. Temp. 101.5°.

The temperature was not again taken until the next morning, when it was found to be 99.5°. The animal seemed to have wholly recovered from any discomfort which it had suffered.

EXPERIMENT II.—Two days later a similar amount of the syrupy residue was administered to the same cat in the same manner.

Temperature before the injection, 99.5°

Time of injection, 4:30.

5:00. Temp. 102°.

The temperature was not taken again until next morning, when it was found to be 99.5°.

EXPERIMENT III.—A similar amount of the syrup was administered to another cat.

Temperature before the injection, 100°.

Time of injection, 3:33.

4:08. Temp. 101°.

4:33. Temp. 101°.

4:50. Temp. 101.6°.

EXPERIMENT IV.—Dec. 1. A much larger amount of the syrup than that used in the preceding experiments was injected under the skin on the back of a large Maltese cat.

Temperature before the injection, 99.5°

Time of injection, 4:03.

4:19. Temp. 99.4°; marked salivation.

4:44. Temp. 98°; pupils are widely dilated. The cat vomits heavily and persistently.

5:30. Temp. 100°. The retching continues and a watery secretion flows from the mouth, nose, and eyes.

6:00. Temp. 100°. Seems in a stupor.

2d. 8:00 A.M. Temp. 103.4°. Stupor continues.

1:40 P.M. Temp. 103.4°. When touched on the abdomen the animal cries as if in pain.

4:20. Temp. 104.1°. The animal seems much excited and dashed through the door of the room once, though she had previously been very quiet.

3d. 9:15 A.M. Temp. 99.6°. Seems to be recovering, but still looks very haggard. Has eaten nothing since the injection.

1:40 P.M. Temp. 100.8°. Eats some meat.

4th. 8:50 A.M. Temp. 99.5°.

The cat was now killed with chloroform and careful examination made of the abdominal and thoracic organs. No abnormality could be found.

EXPERIMENT V.—Some of the syrup obtained from the milk which was inoculated with Iron Mountain water was injected under the skin on the back of cat. The temperature in this case was taken in the rectum.

Temperature before the injection, 102.5°.

Time of the injection, 3:55 P.M., Dec. 9.

4:40. Temp. 97.6°.

5:25. Temp. 100.9°.

10th. 9:05 A.M. Temp. 103.6°.

2:40 P.M. Temp. 102.4°.

Both the meat preparation and the milk, which had been inoculated with the Lansing water, were carried through the same chemical processes to which the Iron Mountain preparation had been submitted, but they yielded only traces of the syrupy residue, and these when injected into animals were without effect. These served as controls for the experiments already detailed, and showed that there was nothing in the meat preparation or milk themselves which could cause the effects observed. As further control, however, the sterilized meat preparation which had been prepared as a control, and which had remained in the vegetation trough for forty days at the temperature of the body without showing any bacterial growth, was treated in the same manner that the other preparations had been, and the alcoholic residue was injected into animals without producing any effect.

Evidently the syrupy residue, which was used in the above experiments, contains a poisonous ptomaine,

the special or characteristic production of the micro-organisms present in the Iron Mountain water; and if these are the germs of typhoid fever, this syrup contains the special poison of typhoid fever. In the intestines of a man suffering from typhoid fever, the germs grow and constantly produce the ptomaine which is absorbed and causes the symptoms of the disease. If our extract contains the typhoid fever poison, we should expect it to produce, when employed as in the above experiments, in general the symptoms of the disease, but we should expect these symptoms to be temporary. We think that this is substantially what is shown by the experiments. The primary depression of temperature observed when the larger amounts were employed, is certainly nothing more than might be expected from a large dose of a powerful poison; then the elevation of temperature which followed was in the majority of the experiments at least sufficiently marked. We did not expect to find in the animal examined the characteristic intestinal lesions of typhoid fever, as we suppose these to be due to the growth and activity of the microorganism, or to the local action of the ptomaine where it exists in largest amount—the place of its formation.

In 1885, Brieger,¹ of Berlin, obtained from pure cultures of the Eberth bacillus, a ptomaine which in guinea-pigs produced a slight flow of saliva, frequency of respiration, dilatation of the pupils, profuse diarrhoea, paralysis, and death within from twenty-four to forty-eight hours. Post-mortem examination showed the heart in systole, the lungs hyperæmic, and the intestines contracted and pale. This substance Brieger considers the special poison of typhoid fever, and calls it typhotoxine, and it may be that we shall find that it forms the active principle of our syrupy residue. At present, however, the two do not seem to be identical. Brieger found no elevation of temperature, at least he does not refer to it, while property of elevating the temperature seems to be the most characteristic effect of the Iron Mountain water poison. Typhotoxine produced profuse diarrhoea; while the other poison has shown no such effect. It may be remarked here that the fever at Iron Mountain has been characterized by the existence of constipation in the majority of cases.

However, these differences in physiological action may be due to the fact that different animals were used, guinea-pigs in one case, and cats in the other.

In 1880, Eberth² first described an oval bacillus, which he had found in the spleen and mesenteric glands of persons dead of typhoid fever, and which is now generally believed to be the true germ of this disease. Before Eberth, Koch had observed this germ and had taken micro-photographs of it. Even

before Koch, Browicz,³ Sokoloff,⁴ Fischel,⁵ and others had individually observed in the tissues of typhoid subjects, oval bacilli, which were probably identical with those of Eberth and Koch.

These bacilli are about one-third as large as the red blood-corpuscles of man, and about three times as long as broad; though they may grow to long threads. The short rods have plainly rounded ends, and very active movements. They are affected by the aniline colors less than most germs, and are best stained by methylin-blue. Whether or not this germ produces spores is a question of much interest to bacteriologists. Gaffky⁶ found that in potato, gelatine and blood serum cultures, kept at the temperature of the body, spores were formed. This observation has been confirmed by Sternberg,⁷ Flüge and Bolton,⁸ Vilchour,⁹ and Chantemesse and Vidal,¹⁰ though on the other hand, Buchner,¹¹ Seitz,¹² Michael,¹³ and Fränkel and Simmonds¹⁴ have, after numerous investigations, been unable to detect any spore formation. This question is also of interest to sanitarians, since germ-spores resist disinfectants, which destroy germs growing without spores. Very recently Birch-Hirschfeld¹⁵ has apparently settled this question by detecting the spores by growing the bacillus in stained cultures. Another point of interest to sanitarians is the capability of this germ to resist high and low temperatures. Prudden¹⁶ found them capable of growth after having been frozen in ice for 103 days and after having been heated to 132.8° F. This confirms the belief of sanitarians in this country that typhoid fever may be induced by the use of impure ice. The same investigations showed that frequent, alternate freezing and thawing did destroy the germ.

Still another point of interest is the fact that this germ will grow in various media. Seitz,¹⁷ and Wolfhügel and Riedel¹⁸ found that it grew abundantly in milk. In our experiments, as has been seen, we obtained the poisonous extract from both the milk and meat cultures, though it was more abundant in the latter. It is worthy of note that the milk culture became acid in reaction, a fact which has also been observed by Löffler.¹⁹ Seitz found that while the bacillus grew in both acid and alkaline urine, its

¹ Birch-Hirschfeld's *Lehrbuch der pathologische Anatomie*.

² Virchow's *Archiv*, B. 66.

³ Prager *medizinische Wochenschrift*, 1878.

⁴ *Mittheilungen aus d. kais. Gesundheitsamte*, B. 2.

⁵ *MED. NEWS*, April, 1887.

⁶ *Zeitschrift für Hygiene*, B. 1.

⁷ *Lancet*, 1886.

⁸ *Archives de Physiologie*, 1887.

⁹ *Archiv für Hygiene*, B. 3.

¹⁰ *Bacteriologische Studien zur Typhusätiologie*, 1886.

¹¹ *Fortschritte der Medicin*, 1886.

¹² *Die ätiologische Bedeutung des Typhusbacillus*, 1886.

¹³ *Archiv für Hygiene*, B. 7.

¹⁴ *Medical Record*, 1887.

¹⁵ *Loc. cit.*

¹⁶ *Arbeiten aus dem kais. Gesundheitsamte*, B. I.

¹⁷ *Berliner klinische Wochenschrift*, 1887.

¹ Weitere Untersuchungen über Ptomaine.

² Virchow's *Archiv*, B. 81 and 83.

growth was more abundant in the latter. However, it is probably of no sanitary importance whether the germ be taken into the stomach in milk or in water, for, in either case, on reaching the small intestine, it will find an alkaline medium in which to multiply. Wolfhügel and Riedel found that the bacillus multiplied in water which had been boiled, when kept at 60.8° F. Bolton found the "spores" in stagnant water a month and longer after the introduction of the germ. Hochstetter¹ found the germ in artificial seltzer water a week after its introduction. Seitz found that quinine, kairin, antipyrin, thallin, salicylic acid, and calomel in certain proportions arrest the growth of the germ in cultures, but that naphthalin, which seems to be a useful intestinal disinfectant in some diseases, is without effect upon the typhoid bacillus.

Upon potato, the typhoid bacillus shows a characteristic growth. It forms a mould wholly invisible to the unaided eye. After three or four days, if kept at ordinary temperature, after two days if kept at the temperature of the body, the surface of the potato looks moist, but no other change is observable. If the surface be scraped with a sterilized needle, and the material thus obtained be examined under a sufficient power, it will be found to consist of active, moving typhoid bacilli. By making potato cultures, this bacillus can be distinguished from all known germs. Indeed, the best bacteriologists regard the potato culture as the crucial test for the typhoid bacillus, and this test must always be made before one can be certain that he has this germ.

That the Iron Mountain water contained the typhoid bacillus was demonstrated by the potato culture and by microscopical examination, as well as by a physiological experiment. The first cultures were made as has been stated, November 9th, about two weeks after the water had been received. These cultures contained, besides the typhoid bacillus, germs ordinarily found in water; but the second cultures, made December 7th, contained only the typhoid bacillus. These had either destroyed or outlived the non-pathogenic organisms. This is an interesting fact, since it shows the poisonous germ to be very tenacious of life. Moreover, this observation is at variance with that of Kraus,² who found that the ordinary water bacteria destroyed the typhoid bacillus, though this difference may be due to the different temperatures at which the water was kept. Kraus kept the water in his experiment at 51° F., while the Iron Mountain water was kept in a jug, in a basement room, the temperature of which was about 68° F.

In meat peptone preparations the bacillus formed a scum, which had the lustre of mother-of-pearl, and

was bluish-gray, becoming slightly brownish after some weeks. Some of this growth was removed with a sterilized rod, rubbed with two c. c. of water, which, when boiled, was taken into a large, sterilized hypodermatic syringe and injected into the abdominal cavity of a cat. Before the injection the hair was cut from the abdomen at the place of injection, and the skin was washed first with absolute alcohol, and then with one-half per cent. solution of mercuric chloride.

The injection was made at 2:25 P. M., December 20th. The temperature of the cat, taken in the rectum, before the injection, was 101.5°. Twenty minutes after the injection, there was a fecal movement, and a few moments later, the animal vomited. The vomiting was repeated four or five times during the afternoon. When not vomiting or attempting to do so, the animal seemed greatly prostrated. She rested on her abdomen with her chin upon the floor and could not be easily aroused. She made several attempts at stool, but there was no purging or diarrhoea.

Dec. 21, 7:45 A. M. The cat still lies in the same position. She refuses food. The temperature in the rectum is 96.4°.

2:30 P. M. Cat still lies upon the floor and refuses milk. Temperature 98.5°.

4:20 P. M. Temperature 101.4°.

5:30 P. M. Temperature 101.8°.

22d, 8 A. M. Cat seems better, but refuses food, and is very weak. She is unable to cry aloud; temperature 103°.

2:30 P. M. Takes some milk; temperature 104°.

4:20 P. M. Temperature 104.4°.

23d. The cat seems to be recovering rapidly. She takes food greedily, and the temperature is normal.

The animal was then killed with chloroform. There was nothing abnormal at the point of injection. Nothing abnormal could be found in the peritoneal cavity. No trace of the small masses of injected bacilli could be found. The mucous membrane of the small intestine was slightly hyperæmic and in the region of Peyer's glands were observed four little ulcerations about the size of a pin head. Two or three similar ones were found in the ascending colon, but one of these was about four times as large as those in the small intestine, and around this was quite an area marked by inflammatory action. Careful inspection of all the abdominal and thoracic organs failed to reveal any further abnormality.

This result was very satisfactory, and leaves no room for doubt concerning the existence of the specific poison of typhoid fever in the Iron Mountain water.

It is to be noted that the lower animals are not subject to long-continued typhoid fever as is man, and a temporary effect from which the animal would within a few days die or recover is all that can be expected. Besides, the lesions in our experiment were certainly satisfactory. We hope to repeat this experiment several times.

¹ Centralblatt für Bakteriologie und Parasitenkunde, E. I.

² Archiv für Hygiene, B. 6.

It will be interesting to know something about the sanitary condition of Iron Mountain. For our information upon this point we are wholly indebted to Drs. J. A. Crowell and G. B. Johnson, physicians to the Chapin mine, who have been kind enough to answer our numerous inquiries.

Iron Mountain is a village with a permanent population of about 4800, and during the summer months this number is augmented by some 2000 floating population. As there are only about 1000 buildings all told, and as some of the dwellings are very small, the village is very much crowded. The village is situated in a valley, the lowest portion of which was once a swamp, extending north and south. Upon each side the hills are steep, and portions of the village lie upon these hillsides. The soil is drift of sand and gravel, except in the lowest portions of the valley, where the drift is overlaid with vegetable mould. The depth of the drift is very variable. In some places, the ledge of rock, which is of the Huronian strata, outcrops on the hilltops; in others, on the hillsides; and in others, in the valley. The ledge stands nearly on edge, dipping at from 70 degrees to 80 degrees to the north. The drift is so porous that within twenty-four hours after heavy rains, the surface becomes dry.

A portion of the village, about three hundred houses, has a system of water-supply, the source of which is a shaft forty feet deep, and far away from any source of contamination. An analysis of this water by Messrs. Brewster and Brown, chemists to the Chapin mine, shows the following:

Free ammonia, parts per million	0.02
Albuminoid ammonia, parts per million	0.05
Chlorine, grains per gallon	0.4
Calcium carbonate, grains per gallon	10.476
Magnesium carbonate, grains per gallon	5.324

Dr. Crowell writes: "Those drinking this water have been almost wholly exempt from the fever, and yet there have been some remarkable exceptions, a whole family coming down, while all the neighbors were free from sickness, and all drinking of this water."

The remaining portion of the village, the part in which the fever prevailed, derives its drinking water from wells sunk from six to twenty feet. There are no sewers or other means of removing filth. Privy wells are used, and slops and garbage are thrown out in backyards and streets. During the past summer, a most disagreeable odor of decomposing matter greeted one in passing along the street. There is a ditch running through the village, which conveys the water from the mine to a small lake beyond the village. This ditch, quite naturally, is used by many as an open sewer, and the ice supplied the village last summer was taken from this small lake into which the ditch empties.

Dr. Johnson writes that the outbreak of typhoid fever appeared early in August, following a severe

epidemic of dysentery. Up to December 21st, he knew of three hundred and fifty cases, about ten per cent. of which had terminated fatally. The later cases, however, are much more malignant than those which occurred during the summer and early fall. Persons have presented themselves daily at the office for a week, complaining of pain in head, chest, and back, loss of appetite, and distressing feeling of languor, but have shown no elevation of temperature, then, within twenty four hours, the temperature will be up to 104° or 105°. Diarrhoea was not present in the majority of the cases; indeed, constipation was more frequently the source of trouble.

The well (known as the Davis well) from which the water was taken which was sent to us, is sixteen feet deep. It is situated under the house, and is forty feet from the stables and privy. Thirteen of the inmates of the house had the fever. (The doctors have failed to inform us of the total number occupying the house or using the water.)

An analysis of the water by Messrs. Brewster and Brown shows the following:

Free ammonia, parts per million	2.27
Albuminoid ammonia, parts per million	0.26
Chlorine, grains per gallon	8.00

These figures give unquestionable proof that the water is contaminated with animal excretions.

Manning's well, situated just across the street from the Davis well, is a driven well, carried down into the rock, and furnishes a fairly good water, notwithstanding the fact that surroundings are bad. Brewster and Brown give the following result of their analysis of this water:

Free ammonia, parts per million	0.017
Albuminoid ammonia, parts per million	0.070
Chlorine, grains per gallon	0.050

Dr. Crowell informs us that it has been decided to supply the village with water from some springs, the analysis of which shows the following figures:

Free ammonia, parts per million	0.032
Albuminoid ammonia, parts per million	0.039
Chlorine, grains per gallon	0.10
Calcium carbonate, grains per gallon	5.090
Magnesium carbonate, grains per gallon	3.558

There can be no question about the need of a supply of pure water. This should be obtained by all means, and some provision should be made for disposing of excrement, slops, and garbage. It matters not how cold it may be this winter, the low temperature will not destroy the typhoid germ unless there be successions of freezing and thawing. And with the soil filled with these germs, some of them will be likely to find their way into the air breathed, food eaten, or water drank, and produce the disease. It should also be remembered that typhoid fever may be caused by the use of impure ice.

Since writing the above, Dr. Crowell has furnished us with some additional facts of interest. "The fever was brought to the village by a man from a

railroad construction camp. This man died a few days after his arrival. The symptoms were very variable. In some they were typical from beginning to end, but in others they were very irregular. Constipation for the first ten days, and frequently throughout the whole course of the disease existed in half the cases; and the abdominal symptoms, pain, tenderness, tympanites, gurgling in the right iliac fossa, although certainly present in many cases, were conspicuously absent in a very large number. Intestinal hemorrhage occurred quite frequently, and was the cause of death in one case in which we could never find any elevation of temperature. A subnormal temperature was very frequently observed, not only in the start, but throughout the disease. Failure of heart power, perforation, hemorrhage, pneumonia, and meningitis, in the order named, were the causes of death. In only one case could we get an autopsy. It was one in which the symptoms were least like typhoid. The temperature was low, and there were no abdominal symptoms, and no diarrhoea; yet the ileum was darkly congested, there were ulcerations of Peyer's patches, and although no perforation could be seen, when the gut was inflated, it slowly collapsed."

In conclusion, we may state that there cannot be any doubt that the epidemic at Iron Mountain is one of genuine typhoid fever. The intestinal lesions were observed in one post-mortem. Similar lesions were found in the cat, the specific germ of typhoid fever exists in the water, and the chemical poison, or ptomaine, is formed by the growth of this germ.

It is well known that typhoid fever invariably follows dry seasons, and is coincident with low water in wells (see paper by the Secretary of the Michigan State Board of Health, Report for 1884, pp. 89-114). There are, on an average, about one thousand deaths and ten thousand cases of sickness from this disease annually in Michigan. These figures can be greatly reduced if people will cease polluting the soil about their houses with slops, garbage, cesspools, and privy vaults, and will see to it that their drinking water is pure beyond all question. When there is any doubt the water should be boiled, but it should be remembered that, while the typhoid germ most frequently finds its way into the body with the drinking water, it may be taken in with any food, and even with the air. When a case of typhoid fever occurs, all discharges must be thoroughly disinfected, and the earth, water, and air about our homes must be pure if we escape this disease altogether.

OMPHALITIS.

BY CHARLES E. FAIRMAN, A.M., M.D.,
OF LYNDONVILLE, NEW YORK.

OMPHALITIS, or inflammation of the umbilicus, is an affection which may be easily overlooked. Pain,

soreness, or distress in the region of the umbilicus, associated with intestinal obstruction, or various abdominal disorders, among which may be mentioned the initial colic of a typhlitis or general peritonitis, will, no doubt, be referred to proper sources. Most of the cases of omphalitis belong to the class of minor ailments, and in the vast majority of such cases a physician is not consulted. If inspection of the umbilicus is not practised in cases of pain, soreness, or distress in this region, omphalitis, when it exists, will not be detected. The affection may occur at any time of life. I give below the history of two cases lately observed.

CASE I.—June, 1887. A physician, æt. fifty-five, with cirrhosis of the liver and ascites, complained of pain at the umbilicus, which he referred to dragging by the liver. At his request I examined the umbilicus, and at first glance detected a dark ring around the umbilicus about one inch from the centre, and one-half inch in diameter. The navel was then closely scrutinized, and moisture and excessive redness appeared. At the bottom of the umbilicus there were five or six spots of minute ulceration and a few drops of pus. The umbilicus was carefully probed, but no fistula existed. Ordered injections of zinc sulphate (gr. iv to aq. 3j), after which the umbilicus was to be carefully dried by absorbent cotton, then sprinkled with powdered iodoform to be retained by packing the navel with absorbent cotton. The symptoms quickly disappeared.

CASE II.—Mrs. W., in August, 1887, brought her son, æt. five, to my office, complaining of pain and distress in the umbilical region. I questioned the lady closely about gastro-intestinal symptoms, but got no history of such. The child's bowels moved regularly and painlessly, and appetite, digestion, and general appearance were normal. Puzzled to explain the symptoms, I inspected the navel, and found omphalitis, due to a neglect of toilet. I ordered thorough ablutions and antiseptic applications. Case did not return.

Causes of Omphalitis.—The causes of omphalitis neonatorum, or inflammation of the navel in infants, may be found described in text-books on obstetrics or diseases of children. Traction upon the cord, retarded birth, friction, and the access of germs have been assumed to bear a causal relation to this form of omphalitis. The causes of omphalitis proper, may be enumerated as follows:

- (1) Want of cleanliness in the umbilical toilet.
- (2) Injuries, blows, wounds, etc. From irritation of rough edges of starched shirts, etc.
- (3) From vesication or counter-irritation applied to the surface of the abdomen.
- (4) From umbilical fistulæ and herniæ; from abscess discharging at the umbilicus; from umbilical malformations,¹ and from furuncles in the umbilical region.

¹ Holmes's Syst. Surg., Amer. ed., vol. iii. p. 853.

Peri-omphalitis, or inflammation of the tissues surrounding the umbilicus, may also be caused by the above agencies. Thus, in Whitman's case (loc. cit.), is said, "On examination, it was seen that inflammation and ulceration extended to some distance around the umbilicus."

Symptoms.—Soreness, distress, and pain, at the umbilicus. Patients will sometimes try to relieve their distress by rubbing the umbilicus, or by placing the tip of the finger over the umbilicus, and rotating the finger. Peri-omphalic redness may be present if the inflammation is severe. Redness of the umbilicus in the milder cases may be seen by putting the umbilicus upon the stretch so as to obliterate the folds, and permit deep inspection. Some amount of swelling supervenes. In simple uncomplicated inflammation of the umbilicus, not occurring as a sequel of hernia, abscess, fistula, or fungus umbilici, I have never seen pouting or protrusion.

An offensive odor sometimes reveals the trouble, as was the result in Whitman's case (loc. cit.). Peri-omphalic ulceration is at times present. Pus and deep omphalic ulcers may be seen, as in Case I. In some cases a ring of black color encircles the navel. This ring is formed from umbilical discharges and extraneous matter.

Diagnosis.—When patients complain of soreness, distress, or pain at the navel, when nurses or mothers speak of foul odors or discharges therefrom, an ocular inspection of the umbilicus should always be made. The whole depth of the umbilicus should be examined (if necessary with a lens and concentrated light). Simple omphalitis will be easily made out.

The smeared circle around the umbilicus may point to the trouble even if no redness on simple inspection be apparent. Pouting and redness may point to abscess, fistula, hernia, polypus, or fungus umbilici. Therefore, omphalitis must not be confounded with umbilical hernial protrusions, nor with biliary fistulæ opening at the umbilicus.¹ In Slocum's case there were pouting and soreness in the umbilical region followed by an opening at the umbilicus and the discharge of bilious fluid, a little pus, and eleven calculi ranging from $\frac{5}{8}$ to $1\frac{1}{8}$ inches in circumference, of a brownish-yellow color and mostly with six facets.

Fecal² and urachal fistulæ³ must be excluded. Furuncles can be readily diagnosed. Herpes, of which I have seen a form which seemed worthy of the specific appellation of herpes umbilicaris, must not be taken for omphalic ulceration. Epithelioma⁴ of the umbilicus I have never seen, but presume it could be readily excluded.

In the case of fungus umbilici of Gatchkoosky⁵

there was a "bright red, solid, globular, umbilical tumor" in a child of two months (case recovered under use of powdered resorcin). The fleshy polypi¹ must be taken into consideration. According to Morris,¹ fleshy umbilical polypi are more or less pedunculated, red, moist, and sometimes associated with fistulæ which admit the probe to a long distance. In Dr. C. W. Stickney's case of abscess,² which was due to "either abscess of the abdominal wall external to the peritoneum or localized suppurative peritonitis circumscribed by adhesions," the umbilicus *protruded* as a rounded red tumor which soon fluctuated and ruptured, discharging a small quantity of healthy pus.

It may be well here to allude to the diagnostic significance of peri-omphalic color and hardness. I have already called attention to the black ring around the umbilicus in Case I. Dr. S. B. Bond believed that a red ring encircling the umbilicus in a newly born child pointed to retarded birth.³ In one of his cases the ring was *bright red and less than two lines wide*.

Prophylaxis.—In the prevention of umbilical inflammation according to Drs. Credé and Weber⁴ the desideratum is a dressing which shall allow the process of desiccation and separation to go on undisturbed. They wrap the stump of the cord in absorbent cotton, and leave it loose under the "belly band." The following methods may also be tried: dressings of salicylic starch powder and various antiseptic occlusive applications. In a word, measures which prevent traction, friction, and sepsis.

In older patients proper washing of the umbilicus should be enjoined. The hygiene of the umbilicus is not often referred to, and its toilet imperfectly performed, thereby allowing offensive secretions, epithelial scales (scurf), and fragments of organic matter—*i. e.*, dirt, fibres of cotton and wool—to accumulate within the umbilical recesses, thus forming a veritable culture cup in which I should not be surprised to learn that some bacteriologist had found special bacteria, as Rosenbach's⁵ bacillus saprogenes No. 1 may (as Hauser⁶ so graphically says) be obtained "aus stinkendem Fusschweiss."

Furthermore, the following rule may be laid down: do not blister the umbilicus if you do not want a troublesome case of omphalitis.

Treatment.—The treatment of omphalitis should be antiseptic. The navel must be thoroughly cleansed by washing, or injections of carbolyzed or sublimated solutions. The navel is then to be dried

¹ Med. Record, vol. viii. p. 255.

² Med. and Surg. Reporter, vol. li. p. 276.

³ International Encyc. Surg., vol. v. p. 864.

⁴ Med. and Surg. Reporter, vol. l. p. 58.

¹ International Encyc. Surg., vol. v. p. 864.

² Med. and Surg. Reporter, vol. xlviii. p. 378.

³ Med. Record, vol. iv. p. 132.

⁴ Amer. Med. Digest, 1885, p. 127.

⁵ Rosenbach: Mikroorganismen, p. 70.

⁶ Hauser: Fäulnisbakterien, p. 50.

and dusted with iodoform (resorcin, etc.), and then packed with simple, or borated, or iodoformed absorbent cotton. If necessary, a few strips of plaster will retain these dressings. In cases attended with indolent ulceration (endophalic) I have recommended injections of zinc sulphate.

In omphalitis resulting from abscess, fistula, fungus umbilici, hernia, polypus, or sarcoma, treatment would be merged into that for the more serious trouble.

MEDICAL PROGRESS.

The Treatment of Habitual Constipation by Enemata of Glycerine.—DR. ALTHAUS has found the following plan of treatment of value:

At a time when not only the tedious proceeding of massage, but actually manipulation of the abdomen by cannon balls is recommended for chronic constipation, a far simpler and more effectual way of inducing peristaltic action of the bowels, which has recently been discovered, should be brought to the knowledge of the profession generally. This consists of the injection into the rectum, by means of an ordinary glass syringe, of about half a teaspoonful or a teaspoonful of glycerine.

An evacuation generally takes place, either immediately or within a few minutes after the injection. The explanation of the effect given by Anacker, and which is no doubt the true one, is this: Glycerine when brought into contact with the mucous membrane of the rectum, withdraws water from it, thus causing hyperæmia and irritation of the sentient nerves of the rectum, which in its turn leads reflexly to powerful peristaltic contractions, ending in defecation. The larger the accumulation of feces, the greater is the effect. There is no discomfort or pain, but the action takes place *cito, tute et jucunde*. Sometimes, however, a little throbbing is felt in the rectum for a few minutes afterward. I feel sure that this plan, on account of its simplicity and readiness, will be found to constitute a veritable improvement in the therapeutics of constipation.—*British Medical Journal*, Dec. 24, 1887.

Amylenhydrate in the Treatment of the Insane.—LEHMANN reports 149 observations on the action of amylenhydrate, on 26 insane women, in an asylum. The doses varied from 15 to 75 grains; on one occasion 90 grains were given. It was given shaken up with water. In 83.2 per cent. of administrations good effects resulted. In the cases of 11 maniacal women the remedy was effectual, in large doses. In melancholia the results were less marked. In two cases of chronic mania, with hallucinations, good results were obtained. In the paralysis of the insane it was also useful. The effect of the remedy was produced in from five to fifteen minutes after administration, and was purely hypnotic. The sleep resulting lasted from six to eight hours. The only unpleasant after-effects noticed were feeble nausea and gastric uneasiness on the day after taking the drug. Amylenhydrate is more efficient than paraldehyde, and although its odor is not agreeable, it does not cause offensive eructations, as does paraldehyde.—*Therapeutische Monatshefte*, December, 1887.

Antipyrin in Epilepsy.—LEMOINE, in an article in the *Gazette Médicale de Paris* of December 24, 1887, con-

cludes that antipyrin is inert in the majority of epileptics; those cases which may be benefited by it are—

(1) Those in which epileptic paroxysms are induced by menstruation.

(2) Those patients whose paroxysms are induced by the irritation of intestinal parasites.

(3) Epileptics whose attacks are attended by migraine. Antipyrin, in quantities of thirty grains per diem, is superior to bromide of potassium in the cases specified.

Antifebrin in Phthisis.—In the *Wiadomosci Lekarskie*, Nos. 5 and 7, 1887, DR. STACHIEWICZ published an able paper on the treatment of phthisis by antifebrin. The paper is based on twelve cases admitted to Dr. Brehmer's hospital in Goebersdorf for pulmonary diseases. They were arranged in three categories, one of which included emaciated and weak patients, with an old standing and still progressing disintegration of the pulmonary tissues; another, those with recent progressive disintegration, the general state being still fairly good; and a third, those with old cavities and slowly progressing infiltration of adjacent parts of the lung, but still in fair general health. Analyzing the cases, Dr. Stachiewicz arrives at the following conclusions: In patients belonging to the first group, antifebrin should be administered in small doses, such as two grains to one grain. Given in doses of four grains it produces in weak persons profuse perspiration and often rigors. The lowering of the febrile temperature takes place in an hour after the administration, reaches its maximum in three or four hours, and lasts from six to eight hours. In patients of the second group, the dose should amount to from four to seven and one-half grains. The antipyretic action develops itself in one or two hours after administration, lasts from three to five hours, and is not associated with rigors or vomiting; sweats and cyanosis are seldom met with; the amount of urine remains unchanged; the pulse becomes slower and fuller. The same may be said as regards patients of the third group. In them antifebrin should be given in doses of four to seven and one-half grains as soon as the temperature rises to 99.8° F.; if a reëlevation of the temperature occurs later on, another dose should be administered. On the whole, the author places antifebrin far above all other antipyretic remedies.—*British Medical Journal*, December 24, 1887.

Omeire.—The German colonist in Southwestern Africa have observed the use of a drink among the natives, composed of fermented milk. It corresponds to koumiss and kefir, and is produced by the action of a ferment similar to that of these beverages.

MARLOTH reports that omeire contains alcohol in small quantities, and that after six or ten hours' fermentation the casein separates from the milk completely.—*Therapeutische Monatshefte*, December, 1887.

The Treatment of Constipation in Children.—From a review of various methods of treatment, by HUCHARD, in the *Revue Gén. de Clin. et Thér.* of December 29, 1887, we take the following prescriptions:

For infants Widerhofer uses

Mannit.	grs. 6.
Aquæ bullient.	3 iō.

Mix, and allow to cool. A teaspoonful for a newborn child.

Castor oil may be made less objectionable to children by combining

Castor oil,
Malaga wine āā m 75 to 3 2½.

Widerhofer combines rhubarb and magnesia as follows:

Rad. rhei pulv.,
Magnes. calcin.,
Fœniculi. Equal parts.

As much as will lie upon the point of a medium-sized knife blade may be given to an infant in the morning, and repeated, if necessary.

In the more obstinate constipation of older children, Simon has found the following liquid efficacious:

Tinct. cascariillæ,
Tinct. rhubarb.
Tinct. cinnamon.
Tinct. colombo,
Tinct. gentian. āā 3 2½.
Tinct. nucis vom. m 75.

For children older than three years, 10 drops of this mixture may be given in cold water before meals.

Widerhofer prescribes pepsin as follows:

Pepsin grs. 9.
Sacchar. lac. grs. 60.

In four doses: two doses daily, before nursing.

After nursing,

Acid. hydrochlor. gtt. 5.
Aqueæ destill. 3 10.

Two small teaspoonsful may be given twice daily, five minutes after nursing.

Henoch prescribes,

Pepsin grs. 15.
Acid. hydrochlor. m 7½.
Aqueæ destill. 3 30.
Sacchar. 3 2½.

A teaspoonful four times daily.

Bouchut has used the following for infants:

Podophyllin. gr. ¼.
Syrup. althææ 3 22.
Cognac 3 3.

Dose, 1 or 2 teaspoonsful.

Cascara sagrada and saccharin may be combined as follows:

Ext. cascar. sagrad. (alcohol.) grs. 7½.
Glycerin. pur. 3 12½.
Saccharin. grs. 3 to grs. 7½.

Dose, 1 or 2 teaspoonsful; if the bitter taste of the cascara is not disguised by the saccharin, tincture of cinnamon will be found useful.

West considered licorice as especially adapted to children, and prescribed it as follows:

Glycyrrhizæ 3 15.
Sennæ 3 15.
Sulphur. lot. 3 7½.
Fœniculi 3 7½.
Sacchar. 3 45.

Dose, proportionate to age and peculiarities of the case.

Tetanus Cured by Morphia and Cocaine.—LOPEZ is quoted by the *Journal of Nervous and Mental Diseases* for December, 1887, as reporting in an Italian journal the following case:

M. G., fifty years old, having worked in the cold and wet, complained of rheumatic pains in the back and extremities. Three days after he had an attack of opisthotonus and painful spasms, and all the symptoms of idiopathic tetanus. Morphine and chloral hydrate were prescribed. For three days the patient, under the influence of these medicines, had little pain, but there were increased muscular rigidity and spasms. At last he was unable to swallow, and death was believed imminent. Injections of morphine were without effect. Then the writer injected three syringefuls of a mixture of morphine and cocaine, five per cent. of each. The effect was immediate. After two hours he could move the extremities, open his mouth, and turn himself in his bed. The next day he continued to improve. There remained a slight trismus and a little rigidity of the neck. A quarter of a syringeful of the same solution was injected in each side of the neck. The day after, all the symptoms had disappeared, and in a few days the patient gained strength and was able to return to work.

Cornutin.—LANGAARD, in an article reviewing the active principles of ergot, describes cornutin as having been used in 46 cases in the Midwives Clinic at Stuttgart by Erhard. The results were, a distinct effect in 34.7 per cent. of the cases treated; a probable effect in 28.2 per cent.; a doubtful effect in 17.3 per cent.; and no result in 19.5 per cent. Six of the children were stillborn, and Langaard advises against the use of cornutin without special caution in this regard. The dose employed was one-fifteenth of a grain, in pill form.—*Therapeutische Monatshefte*, December, 1877.

The Preparation of Koumissed Peptones.—In addition to the description of these food stuffs, published in the *THE MEDICAL NEWS* of December 31, 1887, we quote, from the *British Medical Journal* of December 24, 1887, DR. ANDERSON'S method of preparation, as communicated by him, as follows:

To prepare milk previously to being converted into koumiss: Obtain sweet "old or skimmed" milk; steam it until a fairly tough pellicle forms upon the surface, when set aside for twelve hours; then take off the pellicle and any and every particle floating on the surface; add 25 per cent. of pure soft water, and to each quart of the mixture add 20 grains of sodium bicarbonate, and one ounce and a half of either pure clover honey or fine white sugar. Mix in the ferment, namely, either about a quarter of a pint of fairly new koumiss, or, in the absence of this, the honey ferment described. Bottle at once in champagne bottles and securely cork and wire them. Submit them to a uniform temperature of about 80° F. for from twelve to twenty-four hours. A drop or two of koumiss, exuding through the cork, shows that the process is complete. The bottles may be shaken and put away in a cool place. The koumiss has now a slightly acid taste, and is fit for immediate use, but it will keep good for an indefinite period, except that it daily becomes more acid.

To prepare milk previously to being pancreatized or peptonized: Obtain sweet "old or skimmed" milk, and

steam and treat it in all respects as for koumiss. Add no water. Having removed the pellicle and floating particles, add a sufficiency of pancreatine, and to each quart of the steamed milk twenty grains of sodium bicarbonate. Keep the milk at a temperature of about 130° or 140° F. for the space of two hours, stirring about once each fifteen minutes. At the expiration of two hours, raise the temperature quickly to the boiling point, and then set aside to cool. If it is intended to peptonize by adding pepsin and not pancreatine, the sodium bicarbonate must be omitted until after the completion of the process (two hours), and after boiling. If it is intended that both pepsin and pancreatine be employed, then after the completion of the action of pepsin, and after boiling, the milk must be neutralized by addition of a sufficiency of sodium bicarbonate before adding the pancreatine. Milk "alone" I never peptonize, but I always pancreatize it. Having completed one or both of these processes, and allowed the result to cool, the same process is gone through as with ordinary koumiss, with the exception that no water is added.

One correspondent questions whether 25 per cent. of the water of milk is driven off during the process of peptonization. Considering that the milk is maintained for two hours at a not less temperature than 130° F., and then is boiled, I do not think the matter difficult to understand.

The honey ferment will keep active, if occasionally fed with fresh honey, or a little sugar.

The Hypnotic Action of Antipyrin in the Insane.—MAIRET and COMBEAUME have obtained the following results in the use of antipyrin among the insane.

More than fifty cases were treated by this drug, and its use was continued for several consecutive weeks. In a dose of 60 grains, given in aromatic water at bedtime, the remedy proved useful. As much as 120 grains were given at one time with good results. The effect varied with the type of insanity under treatment. In simple mania the effect varied with the acuteness and intensity of the paroxysm; in the more chronic cases a good result was obtained. In senile dementia antipyrin was useless.

In alcoholic mania, with or without organic lesions, a success, generally positive, was obtained; sleep for several hours, sometimes for an entire night, was secured. In general paralysis from alcoholism antipyrin failed. In epileptiform mania antipyrin produced sleep of considerable duration. It produced an effect, however, generally less well marked than that produced by digitalis and chloral, as given by these writers. The dose of 60 grains never produced toxic effects, although continued for a month; nausea and vomiting occurred twice, but the drug was well borne when repeated. The larger doses were given but a few times, but without ill effects. —*Gazette Hebdomadaire*, December 23, 1887.

The Administration of Hypnone.—LAILLER has given hypnone conveniently, in doses ranging from 20 to 80 drops, combined with alcohol, aquæ laurocerasi, and syrup of orange. —*L'Union Médicale*, December 11, 1887.

A New Deodorant for Iodoform.—HELBING is quoted by the *American Pharmacist* of December, 1887, as having had his attention called to the value of the essential oil of *evodia fraxinifolia* as a deodorant. He had an oppor-

tunity of examining the fruit of this plant, and found that it yields an oil having a most agreeable and powerful odor, which is even able to overcome the smell of iodoform, either in crystalline shape or in solution. For practical purposes it is only necessary to add a little (two drops to the ounce) of the essential oil to the disinfectant in order to obtain a complete deodorization of the latter, the chief objection which has been raised against the use of this valuable remedy thus being obviated.

Local Anæsthesia in the Extraction of Teeth.—DIAN is quoted by the *Therapeutische Monatshefte* for December, 1887, as having injected a mixture of seven and a half grains of cocaine in ten minims of a two per cent. carbolic acid solution, half upon each side of the tooth to be extracted, injected beneath the gum. In 86 cases anæsthesia was produced in five minutes' time. Some have claimed that carbolic acid alone will produce the same result.

An Arsenical Cocaine Paste for Dental Use.—KIRK has found the following useful, and as little painful as any application, in devitalizing tooth pulp.

Acid. arsen. pulv.	gr. 15.
Cocaine hydrochlor.	gr. 15.
Menthol (crystall.)	gr. 4.
Glycerine	q. s.

—*Dental Cosmos*.

Contagious Pneumonia in Swine.—CORNIL and CHANTE-MESSE have determined, by the examination of animals dying from this disease, that the malady is one generally infectious, whose pulmonary symptoms are caused by its mode of introduction into the economy, which is by inspiration of contagious matter. The post-mortem appearances are those of fibrinous pneumonia, and the experimenters demonstrated a bacillus which causes the disease. —*Revue Scientifique*, December 21, 1887.

Poisoning with Hyoscin; Recovery.—DR. GITHENS reports, in the *Therapeutic Gazette* of December 15, 1887, the case of an insane patient who, while she was alone, drank all that remained in a bottle, not less than four-fifths of a grain of hyoscin hydrobromate (granting that the prescription had been properly filled). Profound sleep was the only effect of this enormous dose. A neighboring physician was called in; he used towel slappings and other forms of personal violence, and administered croton oil. He did not see the patient until the next day, when all effects of the hyoscin had passed away, so he could tell nothing of the state of the pupils or skin. The latter was bruised from the violence, and her mouth, tongue, pharynx, and stomach, were in a terrible state of inflammation from the local action of the croton oil. He did not know why it was administered.

Osmic Acid, Hypodermatically, in Intercostal Neuralgia.—SEELIGMÜLLER has treated intercostal neuralgia by hypodermic injections of osmic acid, in solutions of from one to ten per cent. The injections were made deeply into the muscles along the spine, and produced sharp pain at first, followed by relief.

In treating neuralgias of nerves containing both sensory and motor fibres, as the sciatic, the writer would not advise the use of a solution stronger than one per cent.,

fearing paralysis from stronger solutions. His usual dose in intercostal neuralgias was half or the whole contents of an ordinary hypodermatic syringe.—*Therapeutische Monatshefte*, December, 1887.

Hypnotics in Cardiac Disease.—SANSOM, in an article on aortic disease in the *Lancet* of December 31, 1887, writes that when the heart is very irritable and palpitation is frequent, a wakeful night may mean much mischief. As a hypnotic, the action of which is attended with no ill consequence whatever, he has employed urethan in a single dose of twenty grains at bedtime; but this loses its good effect by frequent repetition. Paraldehyde, in thirty-minim doses in almond mixture, may be given as an alternative, the dose being repeated in half an hour if sleep fails to come. These failing, as they do when pain and distress are severe, then the hypodermatic injection of morphia and atropine is the best course, and a few nights of such treatment may suffice to tide over the peril of insomnia. That insomnia is a peril in an aortic case he is well assured, though he is equally assured that the physician must take pains that the morphia habit be not inculcated.

Iodol.—TROUSSEAU has found the following formulæ useful:

For an ointment,

Vaselin.	3 2½.
Iodol.	grs. 30 to 60.

In solution,

Iodol.	3 parts.
Alcohol.	35 parts.
Glycerine.	62 parts.

In disease of the lachrymal duct, the following was found a useful injection:

Liquid vaseline.	3 7½.
Iodol.	grs. 45.

—*Revue Gén. de Clin. et Thér.*, December 29, 1887.

Cataract and Albuminuria.—In view of the opinion that cataract is apt to appear in patients suffering from chronic nephritis, DR. F. O. EVETZKY (*Vratch*, No. 7, 1887, p. 170) has examined the urine and the eyes in 200 cases of cataract at the Moscow Ophthalmic Hospital, in 87 cases of nephritis, and 561 aged persons (inmates of several almshouses). The following are his results: 1. Albuminuria has no influence whatever on the development of cataract. 2. No cataract was found in young patients suffering from nephritis; the affection was met with in old patients, but not more frequently than in elderly people with sound kidneys. 3. Both sexes are attacked by cataract with equal frequency. 4. The development of cataract is favored by bad nutrition. 5. Age has an enormous and essential influence on the formation of cataract. The number of cataract cases amongst the old is very large, the percentage increasing with the age.—*British Medical Journal*, Dec. 24, 1887.

Meat Broths for Children.—In the *Archives of Pediatrics* for January, 1888, JACOBI writes as follows on this subject:

Beef-broth is about as nutritious as whey, and no more. But on account of the extractive substances of beef, kreatin, and kreatinin, it is more stimulating. The temperature of the body is not raised by it. In gastric irritation, gastritis, and acute dysentery it ought not to be given. Veal-broth is liable to increase diarrhoea, mutton-broth constipation, and is therefore preferable in cases of diarrhoea. A broth of beef, which contains from 1.5 to 2 per cent. of albumen, is made by mixing one part of beef and six of water with a little chloride of sodium and allowing it to stand from ten to twelve hours. Then it is slowly boiled and the whole mass pressed out. Still better is a modification of Liebig's beef-tea, which is obtained by adding one half-pint of water, with six or seven drops of dilute muriatic acid, to a quarter or one-half of a pound of finely cut lean beef, stirring it occasionally during two hours, and boiling a few minutes. Beef-juice obtained by pressing out beef after slightly boiling it, contains from 6 to 7 per cent. of albumen. It is slightly acid and spoils quickly.


Excision of the Tongue for Epithelioma.—In the *Lancet* of December 31, 1887, BARWELL describes his method and its application in a recent case as follows:

The method is this. Strictly in and along the middle line an opening is made about one-third of an inch long immediately in front of the hyoid bone, through the raphe of the mylo-hyoid. The genio-hyoid and genio-hyoglossus muscles are separated with the handle of the scalpel until the deep surface of the mucous membrane forming the floor of the mouth is reached. By means of Liston's needles carried under this membrane to, or even beyond, the last molar teeth, threads are passed on each side into the buccal cavity, which in their turn draw flexible wire-twist, first into, then out of, the mouth, in such wise as to surround the base of the tongue as far back as one will. An écraseur working with this wire severs that part of the organ. Then the loop of another écraseur is passed between the teeth, pressed well down on the first incision, and divides the structures beneath the tongue.

In this way then, I operated on August 6th, on George G., aged forty-seven, who had a large epithelioma on the left side of the tongue, behind its middle; the induration, however, extended very far back and across to the other side of the organ. No enlarged glands could be felt. The ulcer was extremely sensitive: eating and even swallowing caused pain and trouble to him, while the very foul condition of the mouth took away all desire for food. During the operation but very few drops of blood were lost. Very soon after recovery from the anæsthetic he wrote on the slate that he was pretty comfortable. Aug. 8th: There had been a copious flow of saliva and other secretions from the supra-hyoid wound. The patient daily took a large quantity of milk and beef-tea, with, he says, more ease than he had done for a long time. The wound was frequently syringed and the mouth rinsed with a 1 in 60 solution of carbolic acid, and the breath was hardly at all tainted. 24th: On the 16th the man could comfortably eat finely minced meat, and had gained flesh since the last report. 30th: He left the hospital, the tongue wound being firmly cicatrized on the 27th. He was able to eat very well, and for the last ten days has been able to enunciate with considerable distinctness.

THE MEDICAL NEWS.

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SATURDAY, JANUARY 28, 1888.

SPLENECTOMY.

In the *Archiv für klinische Chirurgie*, Bd. xxxvi., Heft. 2, ADELMANN, of Berlin, tabulates 53 cases of excision of the spleen for various affections. Omitting the cases of Ferrerius and Dorsey, which were not splenectomies, and adding 4 operations for floating spleen practised by Polk, Myers, Younker, and McCann, and 1 for leukæmia in the hands of Strong, we have 56 cases, of which 38, or 67.87 per cent., proved fatal, thereby showing a higher rate of mortality than laparotomy for any other cause.

The spleen has been removed for leukæmia 20 times, the only recovery having been recorded by Franzolini, in which the disease was in its incipency. Of the 19 deaths, 14 were due to hemorrhage, 3 to shock, and 1 each to septicæmia and exhaustion. In 5 of the deaths from loss of blood the fatal issue ensued either during or soon after the operation; in 4 within twelve hours; in 3 within twenty-four hours; in 1 at the end of twenty-four hours; and in 1 in thirty-six hours. In the majority of the cases the bleeding occurred in separating adhesions and from rents of the organ. In one example it arose from slipping of a ligature.

Splenectomy for so-called simple hypertrophy, or chronic enlargement, shows 13 deaths in 14 cases, 1 from cirrhosis of the liver, 1 from septicæmia, 1 from peritonitis, 2 from shock, and 8 from hemorrhage, the rate of deaths from the last cause being 61.53 per cent., as against 73.68 per cent. for leukæmic

spleen. One of these patients died on the table, and the remainder succumbed within twelve hours. In not less than one-half the vessel had been overlooked; in one the ligature had become detached; while in only one-fourth did the bleeding proceed from the surface of adhesions.

The three cases of excision for malarial hypertrophy were all fatal: 1 from septic peritonitis, 1 from shock, and 1 from parenchymatous nephritis. In two of these cases the loss of blood was profuse.

Wandering or floating spleens have been removed 13 times, with only 2 deaths, 1 from twisting of the stomach, and 1 from collapse. The operation has, moreover, been resorted to in 5 cases of cysts, of which 1 proved fatal, and in 1 case of sarcoma, which was successful.

It will thus be seen that splenectomy is indicated for floating spleen and cysts, and that it should positively be refrained from in all cases of hypertrophy, no matter from what cause that condition arise. The mortality for leukæmic enlargement is 95 per cent., for so-called simple hypertrophy 92.85 per cent., and for malarial hypertrophy 100 per cent. Hemorrhage was the cause of the fatal issue in 68.75 per cent. of the first two conditions; and as that complication was nearly as frequent in simple as in leukæmic enlargement, it is possible that leukæmia was present in a certain number of examples of the former condition. Even if absent, the so-called simple hypertrophy must so impair the hæmatogenous functions of the spleen as to deprive the blood of its plasticity, and bring about a condition of hydræmia. Be this as it may, we take it that a simply enlarged spleen ought never to be excised. Should, however, excision be thought of, it must not be undertaken without a careful preliminary examination of the blood, and, if resorted to, great care must be exercised in hunting for and securing divided vessels, a point which had been neglected in one-half of the fatal cases from hemorrhage.

It may be added that, during the excision of a retroperitoneal sarcoma, Trendelenburg wounded and removed a healthy spleen, and that the patient died of hydræmia in three months.

THE ARMY HOSPITAL CORPS.

AMONG the older members of the profession in this country are many who once had a personal interest in army medical matters. A quarter of a century ago, our journals were filled with letters from valued correspondents at the front, articles on

hospital organization, camp sanitation, and camp diseases, and interesting cases from the experience of the great general hospitals. In turning over their pages, one may see how readily the profession buckled on the harness of war, and how interested were those who stayed at home in the fortunes and experiences of those who went away. At the present day, it is difficult to realize this old-time interest in the army, as we see the most important changes taking place in its hospital organization with scarcely a word of comment in the medical press. Yet many of those who served in the stirring times of the war would be interested in knowing that recently, and only recently, their own experiences have matured, and borne legislative fruit which will benefit the sick and wounded soldier in the future. Those who were in the field with their regiments will remember the fact that men detailed at their request for hospital duty were not those best qualified for it, but those whom commanding officers could spare with least detriment to the fighting strength of their commands; and the experience of those who served at general hospitals would, if recorded, be of a similar tenor, as a requisition for so many hospital attendants was usually filled by a detail of men who would have been sent to hospital as sick had they not been called for as nurses. The war demonstrated the necessity for a special body of trained hospital men; but year after year has passed, and not until even the police of some large cities have been educated and drilled in the methods of giving first aid in accidents has the Army of the United States been provided with a set of men qualified to perform such duties.

The Act of Congress, approved March 1, 1887, authorizes the enlistment of a special corps of men to be attached to the medical department, and to perform its duties under the orders and supervision of the officers of that department.

For post or peace service there is provided one hospital steward for every post—two, if the garrison contains six companies, and one additional for every additional six companies. There is also provided for every post of two companies, or of a single company of cavalry, an acting hospital steward, with privates at the rate of three for each post of one company, four for posts of two companies, with one man additional for each additional two companies. Each post-surgeon is provided with an ambulance and harness, which must be at all times in good order and ready for service, and with hand-

litters, cacolets, travois, and mule-litters as may be required. Moreover, four men of each company are to be designated for instruction as litter-bearers. These bearers will be specially trained to enable them to render temporary aid to the sick and wounded of their organization; but their duties as bearers will not relieve them from their duties as soldiers. It is the intention that the corps of company-bearers shall form the training school for members of the hospital corps, and that the privates of the one will be recruited from the ranks of the other.

In the field in time of war the privates of the hospital corps will constitute two per cent. of the aggregate strength of the command, with an acting hospital steward to every ten privates, and a hospital steward to every thirty. They will perform the duties of litter-bearers, services with the ambulances, at the primary dressing and ambulance stations, and at the field hospitals of the command. They will be organized into a company for each brigade, with their hospital stewards and acting stewards as non-commissioned officers, under command of an officer of the ambulance service or a medical officer detailed for that purpose, and will habitually camp near the division hospital, or, if there be none, near the brigade or field hospital, to give such assistance as may be needed. Ambulances will be allowed and attached on a basis of one to a regiment of infantry of less than 200 men; two to a regiment of from 200 to 500 men; three to a regiment of more than 500; one or two to a regiment of cavalry, according as the latter has more or less than 500 men, and one to a battery of artillery. These, commanded by suitable detailed officers, will be under the control and supervision of the medical director. General hospitals are to have six privates to every thirty beds, with as many stewards and acting stewards as may be required. Hospital boats and cars will be similarly provided.

Outside of the special enlistment of the men for service under the orders of the medical department, the greatest gain to the department lies in the qualifications required for enlistment and promotion. No man may become a hospital steward without having demonstrated his fitness for the position by a year's service as an acting steward, and the latter position is only open to those men who have served a year as privates in the corps. This prevents unmerited promotion; but it has the disadvantage of excluding from the corps thoroughly qualified men who might otherwise be inclined to accept the posi-

tion of steward. A graduate of pharmacy or medicine may not, under the terms of the law, be appointed to a stewardship without passing through the preliminary terms of discipline and probation; few qualified pharmacists would be willing to do this. The uncommissioned officers of the corps must therefore be educated in its own ranks, and by its own officers. Every medical officer has to supervise the instruction of his men and the higher education of his stewards; the latter guide and direct the acting stewards, and these perform similar offices for those who serve under them. Promotion is awarded as the result of competitive examination: First, by a board of medical officers convened at the post at which the candidates are serving, and second, by written papers issued from the Surgeon-General's Office at Washington. The character of these papers call for a high grade of intelligence and knowledge on the part of the candidates. In addition to their knowledge of arithmetic, their familiarity with hospital reports and returns, the preparation and serving of food, and the use of the meteorological instruments, and hospital and field appliances furnished by the medical department, candidates for a stewardship are examined on pharmacy and materia medica as the professional basis of their fitness for dispensing, on minor surgery and the recognized modes of action in the face of medical and surgical emergencies as showing their fitness for field service, and on the elements of hygiene, particularly as related to the sanitation of camps and hospitals. The hospital steward has to be more than a mere dispenser of prescribed drugs; he must be prepared on occasions to take the place temporarily of the medical officer, not only as surgeon and physician, but as health or sanitary officer. The new position is on a higher plane than the old, and the law which institutes it gives an increased, although not a proportionate, remuneration.

The results of these examinations, so far, are said to be very gratifying, as showing the men at present holding these positions to be generally capable of the duties newly assigned them. Surgeon-General Moore has taken much interest in the development of the corps, in the assignment of individuals in accordance with their merits, and in defining and limiting the extent of the professional subjects which the men are required to know. Post-surgeons, also, have done much to prepare those serving under them for their places under the new law. We may anticipate, therefore, that in a short time our army will

have what it has never had heretofore—a special corps of men fully trained for all the accidents of peace, and the emergencies of war.

The experiment in progress in the development of this corps will be watched by medical officers connected with our militia organizations. Some prominent State officers have already made inquiries concerning it. Our army is small, but its constant service on a peace footing in the east, and a war footing in our yet unsettled west, will enable it to crystallize that which is of practical value around the nucleus of the new corps, and give to our State militia a system, ready formed, for adoption.

STOMACH-COUGH.

THIS often troublesome and annoying condition has been thoroughly studied, both experimentally and clinically, by such observers as Nothnagel and Ebstein, and several men almost equally well known. That the cough is purely reflex is generally believed by practitioners, although the exact method of its production is still in doubt. Irritable conditions of the stomach, particularly of the peripheral sensory nerves in this organ, undoubtedly predispose to it, and, if the patient be hysterically inclined, the diagnosis is the more readily made.

In a case reported by BULL, in the *Deutsches Archiv f. klin. Med.*, of December 9, 1887, occurring in a servant girl of twenty-four years, symptoms manifested themselves showing disordered gastric function, but these were scarcely sufficient to excite suspicion. The cough had been present for a long period of time, and had persisted notwithstanding the use of cough medicines. There was no history to account for any disorder of the nervous system, and as no physical signs were present indicating respiratory disease of sufficient vigor to produce trouble, the patient was carefully dieted, and the alimentary canal treated as indications arose. The food allowed was chiefly milk and finely powdered meats given in small and frequently repeated quantities.

These cases are, of course, by no means uncommon, but we think that many of the coughs which are treated as respiratory in origin, and which do not yield to ordinary treatment, may be due to gastric trouble.

Certain it is that every practitioner sees cases constantly in which the physical signs are by no means of sufficient importance to produce severe cough, and it would seem probable that in these cases the

few bronchitic râles are rather the result of the cough than factors in its cause.

SMALL PARKS OR OPEN SPACES.

THAT is a short-sighted and mistaken policy which ignores the provision of small parks or open spaces for the adornment of the city and the recreation of its inhabitants. Such spaces interspersed throughout the populated districts, adorned with trees and shrubbery, and properly cared for, interrupt the monotony of solid blocks of compact buildings, beautify the city, and yield hygienic advantages of no small value. They afford places for healthful recreation for the children of the vicinity, who otherwise would be denied this privilege. They please the senses, and help to cultivate a fondness for the beautiful in nature.

By the exercise of intelligent foresight, plots of ground, judiciously selected, could be procured at moderate cost in advance of the extension of building operations, and reserved for the future uses of the public. On the other hand, by neglecting this precaution, the opportunity is lost, as the enormous expense of procuring suitable spaces for public pleasure-grounds in districts already populated is sure to defeat the undertaking. In extending the plans of our rapidly growing cities, past errors should be retrieved as far as possible by wisely designating numerous spaces to be reserved for the adornment of the city, and for the pleasure, recreation, and health of future generations.

WE are glad to learn that DR. W. W. KEEN's case of brain tumor which was operated upon December 15, 1887, is doing well. Ten days after the extirpation he had a sharp rise of temperature to over 104° , with diarrhoea and marked bulging of the flap, paresis of the right leg, paralysis of the right arm and right lower face with aphasia. These severe pressure symptoms, coupled with the considerable blood clot formed in the wound in the few days after the operation, led to the fear of suppuration and the wound, which had nearly healed, was reopened to some extent, but no pus was found. A hernia cerebri has, of course, followed, but this is healing slowly under the antiseptic dressings, and seems to be doing no harm. The leg and face have entirely recovered, the aphasia has disappeared and the arm is regaining its function. As six weeks have passed since the operation, it is reasonable to conclude that the patient will make a happy recovery. His intelligence has not suffered at any time.

THE Medical Society of the State of New York will hold its eighty-second annual meeting at Albany, on the 7th, 8th, and 9th of February, under the presidency of Dr. Alfred L. Loomis. The programme is very full and attractive, and includes discussions on "Acute Bright's Disease," by Drs. Delafield, Jacobi, Roosa, Van Santvoord, Barker, Jewett, and Ely; on "Salpingitis," by Drs. Goodell, Mundé, Lee, Mann, Seymour, Castle, Polk, Wylie, and Vanderveer; on "Intestinal Obstruction," by Drs. Stimson, Wey, Vanderveer, Park, Weir, and Curtis; and on "Treatment of Tubercular Affections of Joints," by Drs. Phelps, Gibney, and Gerster. The President's Address will be delivered on the evening of the 8th.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

Stated Meeting, January 19, 1888.

THE PRESIDENT, A. JACOBI, M.D., IN THE CHAIR.

DR. H. CAILLÉ read a paper on

A METHOD OF PROPHYLAXIS IN DIPHTHERIA.

He said that in some households one or more members of the family, especially among the children, had an attack every spring or autumn, and it had occurred to him that in all probability in such cases the microbes of the disease remained permanently in the system, continuing in a dormant condition until some irritation or catarrhal inflammation of the faucial or nasal mucous membrane afforded an opportunity for the diphtheria to break out afresh. The disease was thus propagated by a process of auto-infection.

In order to make a practical test of the correctness of this hypothesis, he selected eight individuals of different ages, all of whom had had diphtheria at least twice, and some of them quite a number of times, prior to October 1, 1885. All belonged to families whom he had known for a long time, and who had continued to reside in the same house or apartments. The first thing that he did was to cause all carious teeth to be filled or extracted. He then directed the mouth to be thoroughly rinsed, and the throat to be gargled, and the nose to be cleansed, three times every day, with either a three per cent. solution of potassium permanganate, a weak solution of liquor sodæ chlorinata, or a saturated solution of boric acid; the different solutions being alternated with each other from time to time. In very young children the antiseptic solutions were dropped into the nostrils with a pipette. This practice was maintained throughout the year, except during the summer months, when none of the subjects had ever had diphtheria.

In addition to these eight cases, he ordered that from ten to fifteen drops of a saturated boric acid solution should be dropped into the nostrils of two infants, a year old, whenever any catarrhal symptoms manifested themselves. The result of these precautions was, that up to the

present time, not one of the individuals referred to had had diphtheria since the system of prophylaxis had been commenced, although some of them during the time mentioned had been exposed to the disease by other members of the family having it.

While this result does not, of course, afford absolute proof of the prophylactic power of such a plan of procedure, it does go to show that if the nasal and oral cavities are kept clean by means of antiseptic solutions, diphtheria is less liable to occur than if no such precautions are resorted to.

It is a fact, that hitherto in diphtheria, far less attention has been paid to prevention than to the treatment of the disease after it has made its appearance. One reason why it is difficult to employ an intelligent prophylaxis, is because of our ignorance of the nature and significance of so-called diphtheria. Since we cannot in many instances distinguish between a contagious and a non-contagious sore throat, the problem presented is a very unsatisfactory one to handle. There is no specific treatment for diphtheria, and in the present state of our knowledge, prophylaxis is of more value to the public at large than treatment. Prophylactic measures can be divided into those relating to general sanitary conditions, and those confined within the family. It is an unfortunate fact that in a large city the great majority of the inhabitants cannot live in perfectly healthy habitations, and the great importance of individual prophylaxis is, therefore, obvious.

Dr. Caillé then passed in review a large number of works on practice and on diseases of children, showing that most authors scarcely allude at all to the subject of prophylaxis against diphtheria, while many others dismiss it with a few lines. Among those mentioned as devoting proper attention to it, were J. Lewis Smith and A. Jacobi. In speaking of the importance of keeping the upper air passages in good condition, with a view to preventing the occurrence of diphtheria, he quoted one writer as saying that a healthy throat has the same relation to diphtheria as a healthy stomach to cholera. In a city with densely populated districts, he went on to say, attention to the plumbing and ventilation of apartments, and sanitary conditions in general, must be supplemented by individual prophylaxis. The overheating of school-houses and dwellings is a constant source of danger, and isolation of those sick with diphtheria is not, as a rule, secured promptly enough. Enlarged tonsils increase the liability to diphtheria, and these should be removed with the knife, or, better, the galvanocautery. Carious teeth should be removed or filled, and he thought that provision should be made by which the poor could have dental cavities filled with cement or amalgam for nothing, or at a merely nominal price. He advised that parents should inspect their children's throats every morning before sending them to school, and that children should be taught how to gargle at an early age. Children with sore throats, however slight the trouble, should not be allowed to go to school, and kissing children on the lips should be forbidden. Parents should be urged to keep the upper air passages of their children in a healthy condition, especially if they are peculiarly susceptible to diphtheria. In young children, antiseptic solutions should be dropped into the nostrils twice a day, and oftener if there is any nasal catarrh present.

DR. GEORGE T. HARRISON said that he had had such

painful experience in the treatment of diphtheria that he was especially glad to hear something in regard to the subject of its prophylaxis, and that he believed that the use of the precautionary measures advocated in the paper is a step in the right direction. He was also glad, he said, to hear Dr. Caillé emphasize the danger, as he had done in his paper, from so-called follicular amygdalitis, which the President of the Academy, Dr. Jacobi, had so strongly urged in his monograph on this subject in 1886. It is a matter in regard to which the profession, as well as the laity, needs to be on its guard.

DR. FRUITNIGHT said that it is a common experience to find that the first case of diphtheria in a family has advanced to a very dangerous degree before the medical attendant is called in, and, consequently, is very likely to prove fatal. It is also noticeable that afterward, in such families, the parents themselves often institute a system of prophylactic measures, making it a daily practice to examine the children's throats.

DR. S. BARUCH said that he should think that the daily washing out of the nose, by insufflation of antiseptic solutions or otherwise, is a very dangerous practice on account of the liability to excite serious ear-disease, especially if the fluid used is cold.

DR. T. R. POOLEY said that if the nasal douche were avoided, and warm fluids were used with an atomizer or by dropping into the nostrils he did not think there is much risk of causing disease of the middle ear. The safest and best method of washing out the nose is by means of the post-nasal syringe, which can be used with great facility after a little practice.

DR. CAILLÉ explained that he did not recommend the employment of cold liquids.

DR. SEIBERT said that he should like to add a word on the subject of prophylaxis, and that was in regard to the importance of keeping children's stomachs in good order, so that the mouth and tongue would be clean. In his experience a furred tongue is always a hotbed for the development of diphtheritic trouble, and he thought that the candy-shops in the vicinity of the public schools were responsible for a good deal of the diphtheria now so prevalent. These remarks, he said, were prompted to a considerable extent by his experience in the case of his own children.

THE PRESIDENT said that, if he understood the reader of the paper rightly, he believed that when a patient has once had diphtheria the germs of the disease are likely to remain secreted in the mucous membrane and lymphatic glands, and he quite agreed with Dr. Caillé in this opinion. Many of the cases of diphtheria of the greatest severity are those in which there is immense glandular swelling with oedema. Such cases are very likely to prove fatal, but if the patients recover the improvement dates from the time when these symptoms first begin to diminish. He felt sure, therefore, that diphtheritic germs are liable to remain in the lymphatics.

He desired to call attention also to another way in which the disease recurs. It had been remarked, that if the mouth is in a healthy condition, diphtheria is less likely to occur, while, if an epidemic of the disease appears in the locality where they reside, children who have a catarrh are especially liable to an attack. Diphtheria is like erysipelas in this respect. When there is an epidemic of the latter disease in a neighborhood the slightest scratch is likely to induce an attack of it,

while those who are free from any sore or abrasion of the surface escape. There is one point of great practical value in the prevention of diphtheria. It has often been noticed that cases in which it was thought that the patient was about over an attack of the disease had a relapse, and in some instances there were three or four attacks in quick succession. The reason of this was simply because the room, the bed, the curtains, the carpets, had become infected, and he had, therefore, made it a rule, whenever practicable, to change the room of the patient every two or three days, even if the room to which the removal was made was not as suitable for a sick-chamber as that first occupied. In some cases he had found it necessary to have the patient taken out of the house altogether.

DR. L. EMMETT HOLT said he would like to ask, for information, whether there are any sufficient data to show that children with enlarged tonsils are more subject to diphtheria than others.

DR. CAILLÉ said that his own experience went to show that such children are more liable than others to be attacked, but he believed that, as a rule, in such cases the disease is of a comparatively mild form.

THE PRESIDENT said that the reason why the tonsils are so frequently the primary seat of diphtheria is because they stand so much in the way of the air-current; so that deposits are likely to take place on them. Again, whenever the tonsils are enlarged there is a liability of mucus accumulating behind them. Enlarged tonsils are usually combined with a subacute or chronic nasal catarrh or pharyngitis, and the sooner, therefore, the tonsils are reduced and the pharyngitis removed, the better will be the prospect of the child's escaping diphtheria.

DR. JOSEPH W. WINTERS said that when diphtheria appears in a family, in addition to enforcing strict isolation and attending to disinfection and the general sanitary condition of the premises, he inspects the throat of every member of the household daily, and, if there are children, orders them to take full doses of tincture of chloride of iron (say, twenty or more drops, three times a day), and tonic doses of quinine. At the same time he directs that they shall be kept in the open air as much as possible, shall sleep in rooms free from pipes connecting with sewers, and be given simple diet; while their digestive organs are maintained in good condition. To this end he usually orders small doses of mercury as a purgative, two or three times a week. When adopting these precautions he rarely saw two cases of diphtheria in the same family.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

Stated Meeting, January 11, 1888.

THE PRESIDENT, J. SOLIS-COHEN, M.D., IN THE CHAIR.

DR. HOWARD A. KELLY described his

RUBBER CUSHIONS FOR SURGICAL PURPOSES.

It is now almost a year, he said, since he put in the hands of Mr. Levick, manufacturer of rubber goods, several designs of cushions for surgical purposes. These cushions resemble those commonly used to sit on in having an inflatable rim, but differ in being left open on one side, being C-shaped or rectangular, with one side out. They have a bottom of rubber sheeting extended into an apron some inches in length for the purpose of

drainage. He has had constructed three separate forms, a large C-shaped cushion measuring about twenty inches in diameter, the opening of the C being about eight inches across, and the apron twenty inches in length. The rim measures about two inches in diameter when inflated. This pad he constantly uses for abdominal sections, it is also of great service in obstetrical cases requiring operative manipulation. It permits the free use of water for douching purposes; drains all blood and water from the field, enabling the operator to return the patient at once to bed, without the necessity of removing clothing or changing linen.

A similar pad of the same pattern, measuring but ten inches in diameter, is in use on the examining table in his office, in all cases in which it is necessary to douch out the uterus or vagina.



The third pattern, which is in constant use for minor gynecological work, is the perineal cushion. It is rectangular in shape, opening on one side, having a rubber bottom and long apron similar to the preceding. When in use the patient's clothes are elevated, and the thighs held flexed on the abdomen by his "Beinhalter." The buttocks are drawn down over the edge of the inflated rim, and the apron which hangs down from the edge of the table carries off all blood and the water used throughout the operation.

There is no one device in all his gynecological work which has given him so much comfort as these simple cushions. He uses gallons of water with the utmost freedom, and without ever being obliged to think once where it is going. In perineal work, instead of using sponges, he uses constant irrigation, which prevents clotting of blood, soiling of instruments, and replaces at no expense, and with greater comfort and satisfaction, the sponges formerly used. The work thus accomplished is neater and cleaner, and the results are better.

He also presented a design for a rubber bed-pan. It is oblong in shape with an inflatable rim and a rubber bottom. It differs, however, from any previous device, in the fact that one end communicates with a large, funnel-shaped reservoir, terminating in a large nozzle

through which the fluids are finally discharged. The whole peculiarity of the device depends upon the funnel and its outlet; the funnel is very broad at the top, being the full width of the cushion, about seven inches in depth to the tube, terminating in the discharge pipe of the same length, which is perforated at its under side by a button-hole for attachment, when in use, to the rim of the cushion. When the cushion is in use the rim is inflated, the discharge pipe is buttoned to the rim, and the patient is placed upon the cushion. Vaginal or rectal injections are now to be given. The fluid, as it is discharged from vagina or rectum, accumulates on the floor of the cushion, the amount this will hold depending entirely upon the depth of the inflated rim and the size of the cushion and reservoir. When it is desired to empty it the rim is caught in the hand at the upper end, and carried with the funnel hanging downward; all fluids at once gravitate into this, but do not escape, owing to the attachment of the discharge pipe to the rim. It is then carried to the closet and the discharge pipe unbuttoned, when the fluid rushes out; it is further cleaned by allowing water to run freely through it in the same manner.

The advantages gained by this device are very great. The softness of the rubber is a great advantage over the hard bedpan, the capacity of the cushion is much greater, and may be made to vary with the size of the reservoir alone. It can thus be used for purposes for which the bedpan is entirely inapplicable. The facilities for cleansing are perfect, eliminating the chief objection to which rubber cushions hitherto in use are open. The ease of transportation is also an available feature, as when collapsed it can be rolled up and packed away in small space. It can also be used for continuous irrigation, by leaving the discharge pipe, which can be made of any length, hanging over the side of the bed, discharging on a piece of rubber sheeting which conducts the fluid into a bucket.

DR. J. PRICE said that the only matter about which any question exists, is whether Dr. Kelly has any claim whatever as the inventor or originator of the irrigation pad. Such claim he has not only set up here but elsewhere, without, he thought, a shadow of authority in fact. Introducing the instrument here he has made it legitimate matter for discussion; not only as to the merits of the instrument, but the genuineness of its authorship. About five years ago he conceived the importance of an irrigation pad or cushion, and from a design of his own, Dr. J. Madison Taylor made a drawing. The instrument, as drawn, was ordered through Kolbe. Dr. Kelly saw it not only at the instrument store, but also at his office. He there examined it and discussed its merits.

DR. KELLY was sorry that anything so unpleasant should have come before the Society, and he could only say that he had no recollection that Dr. Price ever spoke to him on this subject.

CORRESPONDENCE.

ON PERITYPHLITIS AND THE EARLY DETECTION OF SUPPURATIVE PERITONITIS FROM PERFORATION OF THE APPENDIX VERMIFORMIS.

To the Editor of THE MEDICAL NEWS:

SIR: In the recent interesting discussion on peri-cæcal inflammation held at a meeting of the Philadelphia County

Medical Society and published in your journal of January 7th, there are raised among the many valuable points connected with the disease in question, two by Dr. Pepper, that have specially attracted my attention and upon which I should much like further information.

He describes in the report two classes of these cases, one where the symptoms present themselves rather sharply, and under judicious management terminate generally in resolution, or they may go after a time to the formation of an abscess, and require for their surgical relief the well-known incision of Dr. Willard Parker. Both of these varieties Dr. Pepper considers to be due to inflammation of the walls of the cæcum and the pericæcal connective tissue, and that in them the appendix is affected to a comparatively slight degree.

Here more light is decidedly wanted. With such cases Dr. Pepper further remarks considerable impaction of feces exists, and in so far he is in accord with Kraus-sold, who considers such inflammation rarely, if ever, to progress to suppuration unless a perforation exists. And this is the view that the surgical profession is gradually but strongly leaning to. It is supported in this tendency by ever-increasing evidence, showing more and more clearly the rarity of cæcal perforations and the frequency of appendicitis, simple or perforative, as the origin of abscesses occurring in the right iliac fossa. Even in the slowly progressing forms of suppuration such as are described by several of the gentlemen participating in the discussion alluded to above, it can be proved by a glance at the series of 100 cases of perityphlitic abscesses undergoing operation, that were diligently collected by Dr. Noyes in 1882,¹ that a majority of these distinctly gave proof of their cause being a perforated intestine. Out of the total of 100 cases, in 40 were recognized feces, fecal concretions or foreign bodies originally lodged in the intestine, and in 14 others gas in marked quantities was observed, while in 45 only, pus was seen in various states of foulness. In only one of the cases was nothing stated as to this point. Matterstock, likewise, in 146 cases of perityphlitic abscesses found fecal concretions 63 times.

Such testimony is corroborated largely by everyone who has frequently operated for perityphlitic abscesses, and, individually, I have felt it a strong argument in favor of an early surgical interference in these cases, and have elsewhere² so expressed myself, believing as I do, that a perforated appendix is generally the starting place of the abscess. The latter may take place outside the peritoneum by adhesion of the appendix, formed with the parietal peritoneum, then, or at a previous slight attack of appendicitis, or it can occur among the adjacent intestines, matted together by protective limiting adhesions, thus giving rise to a veritable intraperitoneal abscess scarcely to be distinguished from the former, or, finally, the fecal extravasation may spread widely and beget a fulminating general peritonitis.

It is in connection with this latter form of the disease that Dr. Pepper has called into notice a means of diagnosis which I consider of much importance. I refer to the use of an exploring needle to detect at a period much earlier than is now possible, the presence of a general sup-

¹ Transactions of Rhode Island Medical Society, 1886.

² A plea for earlier operations in perityphlitic abscesses, with a case of laparotomy for perforation of appendix vermiformis, in the Medical Record of June 11, 1887.

purative peritonitis. An experience of five cases of this form of peritonitis confirms the fact spoken of in your debate, and also reported elsewhere in numerous published cases, that not only does perforative peritonitis go on with great rapidity, but that the usual symptoms of a serous inflammation may frequently be wanting. Moreover, in all the cases seen in those on whom laparotomy has been performed, as well as in those in whom an autopsy has been made, there has been found, as a rule, very slight intestinal adhesions, or none at all, but an abundant secretion of puriform fluid which often collects between the loops of the moderately distended intestines, and is always to be found in large quantities in the pelvic cavity. In two of my cases the use of a large hypodermatic needle showed pus, which the subsequent laparotomy proved to come from the general peritoneal cavity, and I had been led to the same conclusion that Dr. Pepper has, that this test, used in localities other than in the right iliac region, where the possibility of an extra or intraperitoneal abscess might mislead one, would materially aid the surgeon in his decision for a prompt abdominal section, lateral or median, as might be determined on. Similar punctures have already been resorted to along the median line for this purpose. While such a puncture or punctures, for several could be safely made, will afford evidence, when obtained, of great value, yet a positive result is more likely to occur by tapping in this way the pelvic cavity.

Dr. Pepper suggests a curved needle introduced through the rectum. It is, I judge, a safer procedure to empty the bladder and then introduce a long, slender, straight aspirator needle above the pubis deep into the pelvis. This can be done without risk to the intestines in their comparatively undistended state, and a finger in the rectum will afford some guidance, as I have proven to myself in several trials of aspiration in this region for other causes. An early resort to this means of diagnosis has been a standing order with my house-surgeon for some time past, and I cannot refrain from thinking that good will come from it. For up to this time the result following laparotomy for peritonitis caused by a perforated appendix has been nearly uniformly fatal, there being, so far as is known to me, but one undisputed case of recovery out of fifteen cases, and death has occurred mainly from the profound and rapid septicæmia which is usually produced by a fecal extravasation.

Yours most truly,

ROBERT F. WEIR.

NEW YORK, January 17, 1888.

NEWS ITEMS.

The Illness of the Crown Prince.—We are pleased to be able to state that Sir Morell Mackenzie continues to receive highly satisfactory reports concerning the Crown Prince from the physicians in attendance. The condition of the illustrious patient is still better than it was last week. Further absorption of the small vegetation which recently appeared has taken place, and the slight general thickening of the left ventricular band has diminished. There is much less secretion from the larynx, showing that the catarrhal condition of the left side, which has from time to time caused a good deal of trouble, is also greatly improved. The Prince's voice, though rather hoarse, is fairly strong when he makes an effort, but in obedience to the advice of his physicians His Imperial Highness speaks as little as possible. Whilst, therefore, reiterating

the warning we have already several times given as to the imprudence of placing too much reliance on the present favorable aspect of the case, it is, we think, fairly permissible to hope for the best.

We have already called attention to the peculiarly anomalous and perplexing nature of the case, which will, no doubt, apart from all points of extra-medical interest, remain as a *cause célèbre* in laryngological literature. As showing the extreme difficulty frequently met with in the diagnosis of tumors of the larynx, we may refer to a case related by Dr. Eugene Hahn—whose authority in questions of this kind no one will deny—before the Berlin Medical Society last month. A man, aged twenty-eight years, was suddenly seized with acute spasm of the glottis, apparently without any previous symptoms whatever. The presence of a tumor being suspected, tracheotomy was performed, and the larynx was afterward extirpated. On admission an abscess associated with perichondritis of the cricoid cartilage was found, but no malignant tumor was discovered. This case, so frankly reported by Dr. Hahn, affords further justification, if such were needed, for the caution which has led the Crown Prince's present advisers to discountenance severe operative procedures, for which there was no decisive indication, while the danger directly attending them was only too obvious.—*British Medical Journal*, Jan. 14, 1888.

The American Physiological Association.—On Friday, December 30, a meeting was held at the College of Physicians and Surgeons, in New York City, for the purpose of organizing an American physiological association. The association has for its object the promotion of physiological research and of social intercourse among the physiologists of the country. The association will meet as a section of the Medical Congress every three years. The meeting was presided over by Dr. S. Weir Mitchell, and many prominent physiologists from all parts of the country were present. A constitution was adopted, and Prof. H. P. Bowditch of the Harvard Medical School was elected president, and Prof. H. N. Martin of Johns Hopkins University, secretary and treasurer.—*Science*, January 6, 1888.

The German Hospital of Philadelphia.—Dr. George W. Vogler has resigned the position of Visiting Physician.

Philadelphia Polyclinic.—Dr. Alexander W. Mac Coy has been elected Professor of Diseases of the Throat and Nose at the Philadelphia Polyclinic, to succeed Dr. J. Solis-Cohen resigned.

Medical Education in the United States, for the past Ten Years.—The Illinois State Board of Health, in its report on medical education, compares the statistics of the past ten years, which show several points of great interest:

The changes noted by a comparison with the report of 1886 show a net gain of two regular schools and a loss of two eclectic schools; while the others remain unchanged. As compared with the conditions which existed prior to the enforcement of the Schedule of Minimum Requirements—that is, prior to the sessions of 1883-84—the report shows that there are now 114 colleges which exact an educational requirement of intending matriculates, as against 45 formerly—there being no change in this respect from the previous year; that 43 colleges now exact

attendance upon three or more courses of lectures as against 22 formerly—being a gain of two over 1886—and 57 others make provisions for a three or four years graded course; that hygiene is now taught in 114, and medical jurisprudence in 112 colleges, as against 42 and 61 respectively, prior to 1883. There is an increase in the average of lecture-terms from 23.5 weeks to 24.9 weeks during this period, and 114 colleges now have terms of five months or over, and 63 have terms of six months or over as compared with 101 and 41 respectively. There is only one medical college that has a course less than twenty weeks, the Medical College of Georgia.

The effect of this improvement in methods of instruction and of the higher qualifications demanded before graduating the student is best seen in the diminishing percentage of graduates to matriculates. The tables embraced in the report now cover a sufficiently long period—from 1877 to 1887 inclusive—and deal with large enough numbers—116,529 matriculates and 37,493 graduates—to give them a positive value for this purpose. Errors arising from unusual or accidental conditions are largely cancelled or diminished in importance in these aggregates, and the inferences drawn may be accepted as fairly trustworthy.

The first fact of importance which arrests the attention in this comparison is that, notwithstanding the growth of population, the total number of medical students has never yet reached the proportions attained in 1882-3. The sessions of that winter were attended by 13,088 students; of 1883-4 by 12,763 students; of 1884-5 by 11,975 students; of 1885-6 by 12,321 students, and of 1886-7 by 12,948 students. Although there was a gain last year of 627 students over the attendance in 1885-6, the aggregate in 1886-7 was still 140 less than in 1882-3.

The effect of a higher standard of qualifications for graduation is further shown in the diminishing percentage of graduates to the total number of students. In 1882-3 out of every 1000 matriculates 322 were graduated, taking both the United States and Canada and all schools of practice into the account. In 1886-7 only 294 out of every 1000 matriculates were graduated. In the United States alone in 1882-3 out of every 1000 matriculates 331 were graduated, while in 1886-7 only 305 out of every 1000 matriculates were graduated.

The Water Tanks in Passenger Cars.—A sanitary inspection of railway cars by Dr. Reed, disclosed some unsavory conditions of water supply, which he describes as follows, in the *Sanitary News* of January 14, 1888:

I cannot close this paper without referring to the water-tanks as usually found in our coaches, of which twenty and one-half per cent. were found dirty, among which was discovered one with a baby's soiled diaper in it.

Many of these tanks are placed so as to open inside of the water-closet apartment, and I am creditably informed by railroad employes, who have had abundant opportunities for knowing, that it was not an unfrequent occurrence to find babies' diapers, dirty rags, and filth of that character, dumped into the water-tanks of our passenger coaches. So frequently was this the case that some of the railroads have made their cars more recently with the water-tanks opening at the top of the car, while others have placed them in plain view in the car, where offensive articles of that character could not be so easily introduced into them without being detected.

The analysis of the water, with a few exceptions, shows that a very fair quality of water was supplied the passengers on the roads examined. The custom of dumping ice into the water should be dispensed with, and instead a water-tank used that is so constructed as to permit of the ice being packed around the outside of the water-can proper, which should be porcelain-lined, and so arranged as to be easily got at and cleaned, a great objection now to those opening at the top of the car.

While the tops to these refrigerators should not only be double, but locked on, and no person furnished with a key excepting the proper railroad employes, the latter should be held responsible for their sanitary condition.

With such an arrangement, the drinking-water could be kept clean and free from "foreign or domestic" filth, the water kept cool but not ice-cold, and at the same time free from many impurities so frequently found in commercial ice.

Prizes for Medico-legal Essays.—The Medico-legal Society of New York announces the following prizes for original essays on any subject within the domain of medical jurisprudence or forensic medicine:

1. For the best essay—one hundred dollars, to be known as the Eliot F. Shepard Prize.
2. For the second best essay—seventy-five dollars.
3. For the third best essay—fifty dollars.

The prizes to be awarded by a commission, to be named by the President of the Society, which will be hereafter announced.

Competition will be limited to active, honorary, and corresponding members of the Society at the time the award is made.

It is intended to make these prizes open to all students of forensic medicine throughout the world, as all competitors may apply for membership in the Society, which now has active members in most of the American States, in Canada, and in many foreign countries.

Physician's Names and Proprietary Medicines.—DR. WILLIAM A. HAMMOND has caused the arrest of Dr. H. H. Kane, J. F. Phillips, and F. Coleman, officers of a proprietary medicine company, for associating his name with their remedy. They had advertised in the papers that Dr. Hammond had delivered a lecture on the use and abuse of the brain, in which he strongly recommended the patent medicine in question as the proper and only thing for persons afflicted with brain disorders to use. A picture of the famous physician also accompanied the advertisement. When the doctor saw the advertisement he became indignant, as he had not mentioned in the lecture the preparation. The penalty, should a conviction result, will be imprisonment for two years and a fine of \$1000.—*Pharmaceutical Era*.

M. Pasteur.—Owing to continued ill-health, M. Pasteur has thought it necessary to offer to resign his post of perpetual secretary to the Academy of Sciences; but as the eminent biologist is held in great esteem, his application has not been granted, and he has been requested to continue in office with a *locum tenens* to do his work.—*Lancet*, January 7, 1888.

Decorations for Nurses.—M. Carnot, President of the French Republic, on the last day of the old year made a

round of inspection of the various Parisian hospitals, in course of which he decorated with a knight's ribbon Mdlle. Nicolle, the school mistress at the Salpêtrière, who is now in her thirty-sixth year of service, and a Sister of Charity in the military hospital of Val-de-Grâce.—*Lancet*, January 7, 1888.

Type in School Books.—A very sensible decree has just been issued by the Austrian Minister of Public Instruction, forbidding the use of books printed with small type in public schools, as short-sightedness is so prevalent amongst school children in Austria. Scientific supervision might very properly be given to school books in this country, attention being especially directed to the size of the type, length of line, and spacing of letters and lines. In the works published by the Clarendon Press no fault can be found in these respects, and, speaking generally, the school books of this country are well printed. The chief fault in German books is their adherence to the very dazzling Old English shape of the letters, which certainly severely tries the eyes by necessitating very close attention, and the evil effect of this is aided by the paper being coarse and by the light supplied being usually insufficient.—*Lancet*, December 31, 1887.

Hospital Management.—In the report of the Dublin Hospitals Commission, Dr. Corley gives the following as the essentials of success in hospital management:

"*First.* The hospital shall contain not less than eighty beds, and after five years' participation in the grant, not less than one hundred, in daily occupation throughout the year.

"*Second.* The hospital shall be open for clinical instruction, and shall have not less than fifty paying students on its books each year.

"*Third.* The hospital shall be open to persons of all creeds, without any distinction, and clergymen of all denominations shall be admitted to see patients requiring their ministrations at any hour of the day or night.

"*Fourth.* The staff of the hospital shall be appointed without distinction of creed or the place of education, or reference to the candidate's connection with any particular university or medical corporation or hospital, and without payment of any sum of money; and the principle of promotion from the junior to the senior appointments shall be recognized as far as may be deemed compatible with the interests of the institution. No member of the staff shall hold a similar appointment in any other hospital.

"*Fifth.* The junior appointments, such as resident surgeons and physicians, shall be filled up by examination, for which any duly qualified candidate may present himself.

"*Sixth.* The hospital shall employ as nurses only such persons as have gone through a duly recognized probationary training."

Professor Purkinje.—This veteran anatomist and physiologist recently celebrated his one hundredth birthday at Breslau.

The Care of a Population.—In his third and concluding lecture at South Kensington, Mr. Galton dealt with the influences of various kinds of nurture, training, and occupation on the average vigor, longevity, and disposition of large classes of persons. He considered that the sur-

roundings influence future generations rather than the present. With a diagram he indicated the relative proportions of early and late marriages in Germany, England, and European Russia, showing the enormous preponderance of late marriages in the first, and of early marriages in the last; considering that, when other things are equals, early marriages are followed by large families, he led up to the amusing conclusion that the "out-put" of Russian babies reached a thousand a day. From Dr. Ogle's report upon the death-rates of varying ranks, he illustrated his remark that the quality of stock varies with the status of the parents. He then proceeded to the unforeseen and wide consequences of apparently small reforms, instancing the smallness of families in France since the law regulating the equal division of property. In strong terms he then dealt with the prevailing want of statistical imagination and our consequent carelessness as to undoubted social duties, considering that the marriages of phthisical persons should be prevented by public opinion, if not by more stringent measures. He thought that obvious sanitary neglect should be treated as manslaughter, and that legal restraint should check the pursuit of any line of conduct whose average ill effect has been ascertained. In approving terms he referred to the establishment of professorships of physical culture at Amherst and Harvard Colleges in America, and quoted from a correspondent at Wellington the opinion that the "cultivation of man as a whole, and not only in part," should be encouraged by the bestowal of degrees. In New Zealand it would appear that a prize has already been awarded to the "best-made man." Of the value of gymnasia in the hands of medical men rather than of professional athletes, and of the importance of more rigid school hygiene, he also spoke enthusiastically. In conclusion, he gave a brief retrospect indicating his belief in the theoretical possibility of raising the standard of the race by a study of the influences that tend to *eugenism*, a word implying goodness in birth and in rearing.—*Lancet*, December 17, 1887.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF MEDICAL OFFICERS OF THE U. S. MARINE-HOSPITAL SERVICE, FOR THE WEEK ENDING JANUARY 21, 1888.

GOLDSBOROUGH, C. B., *Surgeon*.—To proceed with insane seamen from Chicago to Government Hospital for the Insane, January 16, 1888.

HEATH, F. C., *Assistant Surgeon*.—To proceed to Buffalo, N. Y., for temporary duty, January 21, 1888.

STONER, G. W., *Surgeon*.—To proceed to Wilmington, N. C., Georgetown and Charleston, S. C., Savannah and Brunswick, Ga., Fernandina, Jacksonville, and Pensacola, Fla., as inspector, December 30, 1887. (Omitted from previous lists.)

THE MEDICAL NEWS will be pleased to receive early intelligence of local events of general medical interest, or of matters which it is desirable to bring to the notice of the profession.

Local papers containing reports or news items should be marked. Letters, whether written for publication or private information, must be authenticated by the names and addresses of their writers—of course not necessarily for publication.

All communications relating to the editorial department of the NEWS should be addressed to No. 1004 Walnut Street, Philadelphia.